JOURNEY TO THE SHORES

OF THE

POLAR SEA.

Drawn by Lieut Hood, R.N.

Engraved by Edwd Finden.

THE EXPEDITION DISCOVERING THE COPPERMINE RIVER.

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NARRATIVE OF A JOURNEY

TO THE SHORES OF

THE POLAR SEA,

IN THE YEARS

1819, 20, 21, AND 22.

BY

JOHN FRANKLIN, CAPTAIN R. N., F. R. S.,

AND COMMANDER OF THE EXPEDITION.

WITH AN APPENDIX ON VARIOUS SUBJECTS RELATING TO SCIENCE AND NATURAL HISTORY.

ILLUSTRATED BY NUMEROUS PLATES AND MAPS.

PUBLISHED BY AUTHORITY OF THE RIGHT HONOURABLE THE EARL BATHURST.

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TO

THE RIGHT HONOURABLE

THE EARL BATHURST, K.G.,

ONE OF HIS MAJESTY'S PRINCIPAL SECRETARIES OF STATE,

&c. &c. &c.,

THE FOLLOWING

NARRATIVE OF A JOURNEY OF DISCOVERY TO THE NORTHERN COAST OF AMERICA,

UNDERTAKEN BY ORDER AND UNDER THE AUSPICES OF HIS LORDSHIP,

IS, BY PERMISSION, INSCRIBED,

WITH GREAT RESPECT AND GRATITUDE,

BY

THE AUTHOR.

CONTENTS.

CHAPTER I.

Page

Departure from England—Transactions at Stromness—Enter Davis' Straits—Perilous Situation on the Shore of Resolution Island—Land on the Coast of Labrador—Esquimaux of Savage Islands—York Factory—Preparations for the Journey into the Interior 1

CHAPTER II.

Passage up Hayes', Steel, and Hill Rivers—Cross Swampy Lake—Jack River—Knee Lake, and Magnetic Islet—Trout River—Holey Lake—Weepinapannis River—Windy Lake—White-Fall Lake and River—Echemamis and Sea Rivers—Play-Green Lake—Lake Winipeg—River Saskatchawan—Cross Cedar and Pine-Island Lakes—Cumberland-House 27

CHAPTER III.

Dr. Richardson's Residence at Cumberland-House—His Account of the Cree Indians 59

CHAPTER IV.

Leave Cumberland-House—Mode of Travelling in Winter—Arrival at Carlton House—Stone Indians—Visit to a Buffalo Pound—Goitres—Departure from Carlton-House—Isle à la Crosse—Arrival at Fort Chipewyan . . . 94

CHAPTER IV*.

Transactions at Fort Chipewyan—Arrival of Dr. Richardson and Mr. Hood—Preparations for our Journey to the Northward 142

CHAPTER V.

Mr. Hood's Journey to the Basquian Hills—Sojourns with an Indian Party—His Journey to Chipewyan 167

CHAPTER VI.

Page

Departure from Chipewyan—Difficulties of the various Navigations of the Rivers, and Lakes, and of the Portages—Slave Lake and Fort Providence—Scarcity of Provisions, and discontent of the Canadian Voyagers—Difficulties with regard to the Indian Guides—Refusal to proceed—Visit of Observation to the Upper part of Copper-Mine River—Return to the Winter-Quarters of Fort Enterprise 193

CHAPTER VII.

Transactions at Fort Enterprise—Mr. Back's Narrative of his Journey to Chipewyan and Return 238

CHAPTER VIII.

Continuation of Proceedings at Fort Enterprise—Some Account of Copper Indians—Preparations for the Journey to the Northward . . . 287

CHAPTER IX.

Departure from Fort Enterprise—Navigation of the Copper-Mine River—Visit to the Copper Mountain—Interview with the Esquimaux—Departure of the Indian Hunters—Arrangements made with them for our return . . . 316

CHAPTER X.

Navigation of the Polar Sea, in two Canoes, as far as Cape Turnagain, to the Eastward, a distance exceeding Five Hundred and Fifty Miles—Observations on the probability of a North-West Passage 362

CHAPTER XI.

Journey across the Barren Grounds—Difficulty and delay in crossing Copper-Mine River—Melancholy and fatal results thereof—Extreme Misery of the whole Party—Murder of Mr. Hood—Death of several of the Canadians—Desolate State of Fort Enterprise—Distress suffered at that place—Dr. Richardson's Narrative—Mr. Back's Narrative—Conclusion. 391

APPENDIX.

		Page
No. I.	Geognostical Observations, by Dr. Richardson	497
No. II.	General Remarks on the Aurora Borealis	539
	On the Aurora Borealis at Cumberland-House, by Lieutenant Hood	541
	Observations on the Magnetic Needle at Cumberland-House, by Lieutenant Hood	547
No. III.	Observations on the Aurora at Fort Enterprise, by Captain Franklin	549
	Notices of the Appearances of the Aurora at Fort Enterprise, by Captain Franklin	554
	Observations on the Deviations of the Magnetic Needle	570
	On the Aurora Borealis at Fort Enterprise, by Lieutenant Hood	580
	Remarks on the Aurora Borealis, by Dr. Richardson	596
No. IV.	Remarks and Tables connected with Astronomical Observations	629
No. V.	Zoological Appendix, by Joseph Sabine, Esq., F.R.S.	647
No. VI.	Notices of the Fishes, by Dr. Richardson	705
No. VII.	Botanical Appendix, by Dr. Richardson	729

LIST OF PLATES.

		Page
View from Morgan's Rocks of the Hill in Hill River	*To face*	33
The Trout Fall	„	37
Manner of making a Resting Place on a Winter's Night	„	97
Portrait of a Stone Indian	„	104
A Buffalo Pound	„	113
Interior of a Cree Indian Tent	„	169
Expedition crossing Lake Prosperous	„	211
Portrait of Akaitcho and his Son	„	203
Marten Lake	„	235
Expedition discovering the Copper-Mine River	„	237
Winter View of Fort Enterprise	„	246
Keskarrah a Copper Indian Guide and his Daughter, Green Stockings	„	254
Portraits of two Esquimaux Interpreters	„	262
Winter travelling on Great Slave Lake	„	277
A Winter Wolf, and a View of the Dog-rib Rock	„	312
Expedition passing through Point-Lake, on the Ice	„	323
The Bloody Fall	„	350
A view of the Arctic Sea, from the Mouth of the Copper-Mine River, at midnight	„	361
Expedition doubling Cape Barrow	„	367
Expedition encamped at Point Turnagain	„	387
Canoe broaching too in a Gale of Wind at Sunrise	„	394
Expedition landing in a Storm	„	395
The Falls of Wilberforce	„	397
Preparing an Encampment on Barren Grounds, for the gathering Tripe de Roche &c.		412
Plate 25	„	707
Plate 26, Back's Grayling's	„	711

The Four plates of Plants at the end of the Appendix and immediately preceding the Maps.

Maps at the end of the book in the following order.

Route from York Factory to Isle à la Crosse.
From Isle à la Crosse to Slave Lake.
From Slave Lake to the Arctic Sea.
General chart of the Arctic Sea.

INTRODUCTION.

HIS Majesty's Government having determined upon sending an Expedition from the Shores of Hudson's Bay by land, to explore the Northern Coast of America, from the Mouth of the Copper-Mine River to the eastward, I had the honour to be appointed to this service by Earl Bathurst, on the recommendation of the Lords Commissioners of the Admiralty; who, at the same time, nominated Doctor John Richardson, a Surgeon in the Royal Navy, Mr. George Back, and Mr. Robert Hood, two Admiralty Midshipmen, to be joined with me in the Expedition. My instructions in substance informed me, that the main object of the Expedition was that of determining the latitudes and longitudes of the Northern Coast of North America, and the trending of that Coast from the Mouth of the Copper-Mine River to the eastern extremity of that Continent; that it was left for me to determine, according to circumstances, whether it might be most advisable to proceed, at once, directly to the northward till I arrived at the sea-coast, and proceed westerly towards the Copper-Mine River; or advance, in the first instance, by the usual route to the Mouth of the Copper-Mine River, and from thence easterly till I should arrive at the eastern

extremity of that Continent; that, in the adoption of either of these plans, I was to be guided by the advice and information which I should receive from the wintering servants of the Hudson's Bay Company, who would be instructed by their employers to co-operate cordially in the prosecution of the objects of the Expedition, and who would provide me with the necessary escort of Indians to act as guides, interpreters, game-killers, *&c.*; and also with such articles of clothing, ammunition, snow-shoes, presents, *&c.*, as should be deemed expedient for me to take. That as another principal object of the Expedition was to amend the very defective geography of the northern part of North America, I was to be very careful to ascertain correctly the latitude and longitude of every remarkable spot upon our route, and of all the bays, harbours, rivers, headlands, *&c.*, that might occur along the Northern Shore of North America. That, in proceeding along the coast, I should erect conspicuous marks at places where ships might enter, or to which a boat could be sent; and to deposit information as to the nature of the coast for the use of Lieutenant Parry. That, in the Journal of our route, I should register the temperature of the air, at least three times in every twenty-four hours; together with the state of the wind and weather, and any other meteorological phenomenon. That I should not neglect any opportunity of observing and noting down the dip and variation of the magnetic needle, and the intensity of the magnetic force; and should take particular notice whether any, and what kind or degree of, influence the Aurora Borealis might appear to exert on the magnetic needle; and to notice whether that phenomenon was attended with any noise;

and to make any other observations that might be likely to tend to the further developement of its cause, and the laws by which it is governed.

Mr. Back and Mr. Hood were to assist me in all the observations above-mentioned, and to make drawings of the land, of the natives, and of the various objects of natural history; and particularly of such as Dr. Richardson, who, to his professional duties was to add that of naturalist, might consider to be most curious and interesting.

I was instructed, on my arrival at, or near, the Mouth of the Copper-Mine River, to make every inquiry as to the situation of the spot from whence native copper had been brought down by the Indians to the Hudson's Bay establishment, and to visit and explore the place in question; in order that Dr. Richardson might be enabled to make such observations as might be useful in a commercial point of view, or interesting to the science of mineralogy.

From Joseph Berens, Esq., the Governor of the Hudson's Bay Company, and the Gentlemen of the Committee, I received all kinds of assistance and information, communicated in the most friendly manner previous to my leaving England; and I had the gratification of perusing the orders to their agents and servants in North America, containing the fullest directions to promote, by every means, the progress of the Expedition; and I most cheerfully avail myself of this opportunity of expressing my gratitude to these Gentlemen for their personal kindness to myself and the other officers, as well as for the benefits rendered by them to the Expedition; and the same sentiment is due towards the Gentlemen

of the North-West Company, both in England and America, more particularly to Simon M'Gillivray, Esq., of London, from whom I received much useful information, and cordial letters of recommendation to the partners and agents of that Company, resident on our line of route.

A short time before I left London I had the pleasure and advantage of an interview with the late Sir Alexander Mackenzie, who was one of the two persons who had visited the coast we were to explore. He afforded me, in the most open and kind manner, much valuable information and advice.

The provisions, instruments and other articles of which I had furnished a list, by direction of the Lords Commissioners of the Admiralty, were embarked on board the Hudson's Bay Company's ship Prince of Wales, appointed by the Committee to convey the Expedition to York Factory, their principal establishment in Hudson's Bay.

It will be seen, in the course of the Narrative as well as in the Appendix, how much reason I had to be satisfied with, and how great my obligations are to, all the Gentlemen who were associated with me in the Expedition, whose kindness, good conduct, and cordial co-operation, have made an impression which can never be effaced from my mind. The unfortunate death of Mr. Hood is the only drawback which I feel from the otherwise unalloyed pleasure I derived from reflecting on that cordial unanimity which at all times prevailed among us in the days of sunshine, and in those of "sickness and sorrow."

To Doctor Richardson, in particular, the exclusive merit is due

of whatever collections and observations have been made in the department of Natural History; and I am indebted to him in no small degree for his friendly advice and assistance in the preparation of the present Narrative. The Appendix is mostly his own.

The charts and drawings were made by Lieutenant Back, and the late Lieutenant Hood. Both these gentlemen cheerfully and ably assisted me in making the observations and in the daily conduct of the Expedition. The paper in the Appendix by Mr. Hood, on the various phenomena presented by the Aurora Borealis, will, it is presumed, present to the reader some new facts connected with this meteor. Mr. Back was mostly prevented from turning his attention to objects of science by the many severe duties which were required of him, and which obliged him to travel almost constantly every winter that we passed in America; to his personal exertions indeed, is mainly to be attributed our final safety. And here I must be permitted to pay the tribute, which is due to the fidelity, exertion, and uniform good conduct in the most trying situations, of John Hepburn, an English seaman, and our only attendant, to whom in the latter part of our journey we owe, under Divine Providence, the preservation of the lives of some of the party.

I ought, perhaps, to crave the reader's indulgence towards the defective style of this work, which I trust will not be refused when it is considered that mine has been a life of constant employment in my profession from a very early age. I have been prompted

to venture upon the task solely by an imperious sense of duty, when called upon to undertake it.

I am indebted to Joseph Sabine, Esq., F.R.S., for the very valuable account of Quadrupeds and Birds contained in the Appendix.

ERRATA.

Page 7 line 22, *for* 3° 28′ 28″ W., *read* 3° 24′ 14″ W.
„ 27 „ 4, *for* Lea *read* Sea.
„ 87 „ 1, *dele* A very new magnesian.
„ 93 „ 13, and 14, *dele* and resembling the garfish.
„ 118 „ 28, *dele* A very new magnesian.
„ 208 „ 3, from the bottom, *for* Troquois *read* Iroquois.
„ 230 „ 3, from the bottom, *for* Martin *read* Little Marten.
„ 282 „ 2, from the bottom, *for* Gilleway *read* Gillivray.
„ 290 „ 20, *for* progressive *read* progress in.
„ 294 „ 10, *for* Isillawkawdoot *read* Isillawdawboot.
„ — „ 19, *for* 11′ 57″ *read* 11.57″.
„ 323 Plate, *for* Point Lata *read* Point Lake.
„ 369 „ 12, *for* Started *read* Left the Harbour.
„ 370 „ 7, *for* Bopulus palsamifera *read* populus Balsamifera.
„ 510 „ 20, *for* Mississippi *read* Missinippi.
„ 528 „ 25, *for* amygdalord *read* amygdaloid.

A JOURNEY TO THE SHORES

OF

THE POLAR SEA.

CHAPTER I.

Departure from England—Transactions at Stromness—Enter Davis' Straits—Perilous Situation on the Shore of Resolution Island—Land on the Coast of Labrador—Eskimaux of Savage Islands—York Factory—Preparations for the Journey into the Interior.

1819. May. ON Sunday, the 23d of May, the whole of our party embarked at Gravesend on board the ship Prince of Wales, belonging to the Hudson's Bay Company, just as she was in the act of getting under weigh, with her consorts the Eddystone and Wear. The wind being unfavourable, and on the ebb tide being finished, the vessels were again anchored; but they weighed in the night, and beat down as far as the Warp, where they were detained two days by a strong easterly wind.

Having learned from some of the passengers, who were the trading Officers of the Company, that the arrival of the ships at either of the establishments in Hudson's Bay, gives full occupation to all the boatmen in their service, who are required to convey the necessary stores to the different posts in the interior; that it was very probable a sufficient number of men might not be procured from this indispensable duty; and, considering that any delay at York Factory would materially retard our future operations, I wrote to the Under

Secretary of State, requesting his permission to provide a few well qualified steersmen and bowmen at Stromness, to assist our proceedings in the former part of our journey into the interior.

May 30.—The easterly wind which had retarded the ship's progress so much, that we had only reached Hollesly Bay after a week's beating about, changed to W.S.W. soon after that anchorage had been gained. The vessels instantly weighed, and by carrying all sail, arrived in Yarmouth roads at seven P.M.; the pilots were landed, and our course was continued through the anchorage. At midnight, the wind became light and variable, and gradually drew round to the N.W.; and as the sky indicated unsettled weather, and the wind blew from an unfavourable quarter for ships upon that coast, the commander bore up again for Yarmouth, and anchored at eight A.M.

This return afforded us, at least, the opportunity of comparing the longitude of Yarmouth church, as shewn by our chronometers, with its position as laid down by the Ordnance trigonometrical survey; and it was satisfactory to find, from the small difference in their results, that the chronometers had not experienced any alteration in their rates, in consequence of their being changed from an horizontal position in a room, to that of being carried in the pocket.

An untoward circumstance, while at this anchorage, cast a damp on our party at this early period of the voyage. Emboldened by the decided appearance of the N.W. sky, several of our officers and passengers ventured on shore for a few hours; but we had not been long in the town before the wind changed suddenly to S.E., which caused instant motion in the large fleet collected at this anchorage. The commander of our ship intimated his intention of proceeding to sea by firing guns; and the passengers hastened to embark. Mr. Back, however, had unfortunately gone upon some business to a house two or three miles distant from Yarmouth, along the line of the coast;

from whence he expected to be able to observe the first symptom of moving, which the vessels might make. By some accident, however, he did not make his appearance before the captain was obliged to make sail, that he might get the ships through the intricate passage of the Cockle Gat before it was dark. Fortunately, through the kindness of Lieut. Hewit of the Protector, I was enabled to convey a note to our missing companion, desiring him to proceed immediately by the coach to the Pentland Firth, and from thence across the passage to Stromness, which appeared to be the only way of proceeding by which he could rejoin the party.

June 3.—The wind continuing favourable after leaving Yarmouth, about nine this morning we passed the rugged and bold projecting rock termed Johnny Groat's house, and soon afterwards Duncansby Head, and then entered the Pentland Firth. A pilot came from the main shore of Scotland, and steered the ship in safety between the different islands, to the outer anchorage at Stromness, though the atmosphere was too dense for distinguishing any of the objects on the land. Almost immediately after the ship had anchored, the wind changed to N.W., the rain ceased, and a sight was then first obtained of the neighbouring islands, and of the town of Stromness, the latter of which, from this point of view, and at this distance, presented a pleasing appearance.

Mr. Geddes, the agent of the Hudson's Bay Company at this place, undertook to communicate my wish for volunteer boatmen to the different parishes, by a notice on the church-door, which he said was the surest and most direct channel for the conveyance of information to the lower classes in these islands, as they invariably attend divine service there every Sunday. He informed me that the kind of men we were in want of would be difficult to procure, on account of the very increased demand for boatmen for the herring fishery, which has recently been established on the shores of these islands: that last year, sixty boats and four hundred men only were employed in this service,

whereas now there were three hundred boats and twelve hundred men engaged: and that owing to this unexpected addition to the fishery, he had been unable to provide the number of persons required for the service of the Hudson's Bay Company. This was unpleasant information, as it increased the apprehension of our being detained at York Factory the whole winter, if boatmen were not taken from hence. I could not therefore hesitate in requesting Mr. Geddes to engage eight or ten men well adapted for our service, on such terms as he could procure them, though the Secretary of State's permission had not yet reached me.

Next to a supply of boatmen, our attention was directed towards the procuring of a house conveniently situated for trying the instruments, and examining the rates of the chronometers. Mr. Geddes kindly offered one of his, which, though in an unfinished state, was readily accepted, being well situated for our purpose, as it was placed on an eminence, had a southern aspect, and was at a sufficient distance from the town to secure us from frequent interruption. Another advantage was its proximity to the Manse, the residence of the worthy and highly respected minister of Stromness: whose kind hospitality and polite attention of his family, the party experienced almost daily during their stay.

For three days the weather was unsettled, and few observations could be made, except for the dip of the needle, which was ascertained to be 74° 37′ 48″, on which occasion a difference of eight degrees and a half was perceived between the observations, when the face of the instrument was changed from the east to the west, the amount being the greatest when it was placed with the face to the west. But on the 8th, a westerly wind caused a cloudless sky, which enabled us to place the transit instrument in the meridian, and to ascertain the variation of the compass, to be 27°. 50′ west. The sky becoming cloudy in the afternoon, prevented our obtaining the corresponding observations to those gained in the morning; and the next day an

impervious fog obscured the sky until noon. On the evening of this day, we had the gratification of welcoming our absent companion, Mr. Back. His return to our society was hailed with sincere pleasure by every one, and removed a weight of anxiety from my mind. It appears that he had come down to the beach at Caistor, just as the ships were passing by, and had applied to some boatmen to convey him on board, which might have been soon accomplished, but they, discovering the emergency of his case, demanded an exorbitant reward which he was not at the instant prepared to satisfy; and in consequence they positively refused to assist him. Though he had travelled nine successive days, almost without rest, he could not be prevailed upon to withdraw from the agreeable scene of a ball-room, in which he joined us, until a late hour.

On the 10th, the rain having ceased, the observations for ascertaining the dip of the needle were repeated; and the results, compared with the former ones, gave a mean of 74° 33′ 20″. Nearly the same differences were remarked in reversing the face of the instrument as before. An attempt was also made to ascertain the magnetic force, but the wind blew too strong for procuring the observation to any degree of accuracy.

The fineness of the following day induced us to set up the different instruments for examination, and to try how nearly the observations made by each of them would agree; but a squall passed over just before noon, accompanied by heavy rain, and the hoped-for favourable opportunity was entirely lost. In the intervals between the observations, and at every opportunity, my companions were occupied in those pursuits to which their attention had been more particularly directed in my instructions. Whilst Dr. Richardson was collecting and examining the various specimens of marine plants, of which these islands furnish an abundant and diversified supply, Mr. Back and Mr. Hood took views and sketches of the surrounding scenery, which is extremely picturesque in many parts, and wants only the

addition of trees to make it beautiful. The hills present the bold character of rugged sterility, whilst the valleys, at this season, are clothed with luxuriant verdure.

It was not till the 14th, that, by appointment, the boatmen were to assemble at the house of Mr. Geddes, to engage to accompany the expedition. Several persons collected, but to my great mortification, I found they were all so strongly possessed with the fearful apprehension, either that great danger would attend the service, or that we should carry them further than they would agree to go, that not a single man would engage with us; some of them, however, said they would consider the subject, and give me an answer on the following day. This indecisive conduct was extremely annoying to me, especially as the next evening was fixed for the departure of the ships.

At the appointed time on the following morning four men only presented themselves, and these, after much hesitation, engaged to accompany the expedition to Fort Chepewyan, if they should be required so far. The bowmen and steersmen were to receive forty pounds wages annually, and the middle men thirty-five pounds. They stipulated to be sent back to the Orkney Islands, free of expense, and to receive their pay until the time of arrival. Only these few men could be procured, although our requisition had been sent to almost every island, even as far as the northernmost point of Ronaldsha. I was much amused with the extreme caution these men used before they would sign the agreement; they minutely scanned all our intentions, weighed every circumstance, looked narrowly into the plan of our route, and still more circumspectly to the prospect of return. Such caution on the part of the northern mariners forms a singular contrast with the ready and thoughtless manner in which an English seaman enters upon any enterprise, however hazardous, without inquiring, or desiring to know, where he is going, or what he is going about.

The brig Harmony, belonging to the Moravian Missionary Society, and bound to their settlement at Nain, on the coast of Labrador, was lying at anchor. With the view of collecting some Esquimaux words and sentences, or gaining any information respecting the manners and habits of that people, Doctor Richardson and myself paid her a visit. We found the passengers, who were going out as Missionaries, extremely disposed to communicate; but as they only spoke the German and Esquimaux languages, of which we were ignorant, our conversation was necessarily much confined: by the aid, however, of an Esquimaux and German Dictionary, some few words were collected, which we considered might be useful. There were on board a very interesting girl, and a young man, who were natives of Disco, in Old Greenland; both of them had fair complexions, rather handsome features, and a lively manner; the former was going to be married to a resident Missionary, and the latter to officiate in that character. The commander of the vessel gave me a translation of the Gospel of St. John in the Esquimaux language, printed by the Moravian Society in London.

June 16.—The wind being unfavourable for sailing, I went on shore with Dr. Richardson, and took several lunar observations at the place of our former residence. The result obtained was, latitude 58° 56′ 56″ N., longitude 3° 28′ 28″ W., variation 27° 50′ W.; dip of the magnetic needle, 74° 33′ 20″. In the afternoon the wind changed in a squall some points towards the north, and the Prince of Wales made the preparatory signal for sea. At three P.M. the ships weighed, an hour too early for the tide; as soon as this served we entered into the passage between Hoy and Pomona, and had to beat through against a very heavy swell, which the meeting of a weather tide and a strong breeze had occasioned.

Some dangerous rocks lie near the Pomona shore, and on this side also the tide appeared to run with the greatest strength. On clearing

the outward projecting points of Hoy and Pomona, we entered at once into the Atlantic, and commenced our voyage to Hudson's Bay—having the Eddystone, Wear, and Harmony Missionary brig in company.

The comparisons of the chronometers this day indicated that Arnold's Nos. 2148 and 2147, had slightly changed their rates since they had been brought on board; fortunately the rate of the former seems to have increased nearly in the same ratio as the other has lost, and the mean longitude will not be materially affected.

Being now fairly launched into the Atlantic, I issued a general memorandum for the guidance of the officers, during the prosecution of the service on which we were engaged, and communicated to them the several points of information that were expected from us by my instructions. I also furnished them with copies of the signals, which had been agreed upon between Lieutenant Parry and myself, to be used in the event of our reaching the northern coast of America, and falling in with each other.

At the end of the month of June, our progress was found to have been extremely slow, owing to a determined N.W. wind and much sea. We had numerous birds hovering round the ship; principally fulmars *(procellaria glacialis,)* and shearwaters, *(procellaria puffinus,)* and not unfrequently saw shoals of grampusses sporting about, which the Greenland seamen term finners from their large dorsal fin. Some porpoises occasionally appeared, and whenever they did, the crew were sanguine in their expectation of having a speedy change in the wind, which had been so vexatiously contrary, but they were disappointed in every instance.

Thursday, July 1.—The month of July set in more favourably; and, aided by fresh breezes, we advanced rapidly to the westward, attended daily by numerous fulmars and shearwaters. The Missionary brig had parted company on the 22d of June. We passed directly over that part of the ocean where the "Sunken Land of

Buss" is laid down in the old, and continued in the Admiralty charts. Mr. Bell, the commander of the Eddystone, informed me, that the pilot, who brought his ship down the Thames, told him that he had gained soundings in twelve feet somewhere hereabout; and I am rather inclined to attribute the very unusual and cross sea we had in this neighbourhood, to the existence of a bank, than to the effect of a gale of wind which we had just before experienced; and I cannot but regret that the commander of the ship did not try for soundings at frequent intervals.

By the 25th July we had opened the entrance of Davis' Straits, and in the afternoon we spoke the Andrew Marvel, bound to England with a cargo of fourteen fish. The master informed us that the ice had been heavier this season in Davis' Straits than he had ever recollected, and that it lay particularly close to the westward, being connected with the shore to the northward of Resolution Island, and extending from thence within a short distance of the Greenland coast; that whales had been abundant, but the ice so extremely cross, that few could be killed. His ship, as well as several others, had suffered material injury, and two vessels had been entirely crushed between vast masses of ice in latitude 74° 40′ N., but the crews were saved. We inquired anxiously, but in vain, for intelligence respecting Lieutenant Parry, and the ships under his command; but as he mentioned that the wind had been blowing strong from the northward for some time, which would, probably, have cleared Baffin's Bay of ice, we were disposed to hope favourably of his progress.

The clouds assumed so much the appearance of icebergs this evening as to deceive most of the passengers and crew; but their imaginations had been excited by the intelligence we had received from the Andrew Marvel, that she had only parted from a cluster of them two days previous to our meeting.

On the 27th, being in latitude 57° 44′ 21″ N., longitude 47° 31′ 14″ W., and the weather calm, we tried for soundings but did not reach

the bottom. The register thermometer was attached to the line just above the lead, and is supposed to have descended six hundred and fifty fathoms. A well-corked bottle was also fastened to the line, two hundred fathoms above the lead, and went down four hundred and fifty fathoms. The change in temperature, shewn by the register thermometer during the descent, was from 52° to 40.5′; and it stood at the latter point, when taken out of the tin case. The temperature of the water brought up in the bottle was 41°, being half a degree higher at four hundred and fifty than at six hundred and fifty fathoms, and four degrees colder than the water at the surface which was then at 45°, whilst that of the air was 46°. This experiment, in shewing the water to be colder at a great depth than at the surface, and in proportion to the increase of the descent, coincides with the observations of Captain Ross and Lieutenant Parry, on their late voyage to these seas, but is contrary to the results obtained by Captain Buchan and myself, on our recent voyage to the north, between Spitzbergen and Greenland, in which sea we invariably found the water brought from any great depth to be warmer than that at the surface.

On the 28th we tacked to avoid an extensive stream of sailing ice. The temperature of the water fell to 39.5°, when we were near it, but was at 41°, when at the distance of half a mile. The thermometer in the air remained steadily at 40°. Thus the proximity of this ice was not so decidedly indicated by the decrease of the temperature of either the air or water, as I have before witnessed, which was probably owing to the recent arrival of the stream at this point, and its passing at too quick a rate for the effectual diffusion of its chilling influence beyond a short distance. Still the decrease in both cases was sufficient to have given timely warning for a ship's performing any evolution that would have prevented the coming in contact with it, had the thickness of the weather precluded a distant view of the danger.

The approach to ice would be more evidently pointed out in the Atlantic, or wherever the surface is not so continually chilled by the passing and the melting of ice as in this sea; and I should strongly recommend a strict hourly attention to the thermometrical state of the water at the surface, in all parts where ships are exposed to the dangerous concussion of sailing icebergs, as a principal means of security.

The following day our ship came near another stream of ice, and the approach to it was indicated by a decrease of the temperature of the water at the surface from 44° to 42°. A small pine-tree was picked up much shattered by the ice. In the afternoon of the 30th, a very dense fog came on; and, about six P.M., when sailing before a fresh breeze, we were suddenly involved in a heavy stream of ice. Considerable difficulty was experienced in steering through the narrow channels between the different masses in this foggy weather, and the ship received several severe blows.

The water, as usual in the centre of the stream, was quite smooth, but we heard the waves beating violently against the outer edge of the ice. There was some earthy matter on several of the pieces, and the whole body bore the appearance of recent separation from the land. In the space of two hours we again got into the open sea, but had left our two consorts far behind; but they followed our track by the guns we discharged. The temperature of the surface water was 35° when amongst the ice, 38° when just clear of it, and 41.5° at two miles distant.

On the 3d of August, when in latitude 59° 58′ N., longitude 59° 53′ W., we first fell in with large icebergs; and in the evening were encompassed by several of considerable magnitude, which obliged us to tack the ship in order to prevent our getting entangled amongst them. The estimated distance from the nearest part of the Labrador coast was then eighty-eight miles; here we tried for soundings, without gaining the bottom. The ship passed through some

strong riplings, which evidently indicated a current, but its direction was not ascertained. We found, however, by the recent observations, that the ship had been set daily to the southward, since we had opened Davis' Straits. The variation of the compass was observed to be 52° 41′ W.

At nine P.M., brilliant coruscations of the Aurora Borealis appeared, of a pale ochre colour, with a slight tinge of red, in an arched form, crossing the zenith from N.W. to S.E., but afterwards they assumed various shapes, and had a rapid motion.

On the 5th of August, a party of the officers endeavoured to get on one of the larger icebergs, but ineffectually, owing to the steepness and smoothness of its sides, and the swell produced by its undulating motion. This was one of the largest we saw, and Mr. Hood ascertained its height to be one hundred and forty-nine feet; but these masses of ice are frequently magnified to an immense size, through the illusive medium of a hazy atmosphere, and on this account their dimensions have often been exaggerated by voyagers.

In the morning of the 7th, the Island of Resolution was indistinctly seen through the haze, but was soon afterwards entirely hidden by a very dense fog. The favourable breeze subsided into a perfect calm, and left the ship surrounded by loose ice. At this time the Eddystone was perceived to be driving with rapidity towards some of the larger masses; the stern boats of this ship and of the Wear were despatched to assist in towing her clear of them. At ten, a momentary clearness presented the land distinctly at the distance of two miles; the ship was quite unmanageable, and under the sole governance of the currents, which ran in strong eddies between the masses of ice. Our consorts were also seen, the Wear being within hail, and the Eddystone at a short distance from us. Two attempts were ineffectually made to gain soundings, and the extreme density of the fog precluded us from any other means of ascertaining the direction in which we were driving until half past twelve, when we had the

alarming view of a barren rugged shore within a few yards, towering over the mast-heads. Almost instantly afterwards the ship struck violently on a point of rocks, projecting from the island; and the ship's side was brought so near to the shore, that poles were prepared to push her off. This blow displaced the rudder, and raised it several inches, but it fortunately had been previously confined by tackles. A gentle swell freed the ship from this perilous situation, but the current hurried us along in contact with the rocky shore, and the prospect was most alarming. On the outward bow was perceived a rugged and precipitous cliff, whose summit was hid in the fog, and the vessel's head was pointed towards the bottom of a small bay, into which we were rapidly driving. There now seemed to be no probability of escaping shipwreck, being without wind, and having the rudder in its present useless state; the only assistance was that of a boat employed in towing, which had been placed in the water between the ship and the shore, at the imminent risk of its being crushed. The ship again struck in passing over a ledge of rocks, and happily the blow replaced the rudder, which enabled us to take advantage of a light breeze, and to direct the ship's head without the projecting cliff. But the breeze was only momentary, and the ship was a third time driven on shore on the rocky termination of the cliff. Here we remained stationary for some seconds, and with little prospect of being removed from this perilous situation; but we were once more extricated by the swell from this ledge also, and carried still farther along the shore. The coast became now more rugged, and our view of it was terminated by another high projecting point on the starboard bow. Happily, before we had reached it, a light breeze enabled us to turn the ship's head to seaward, and we had the gratification to find, when the sails were trimmed, that she drew off the shore. We had made but little progress, however, when she was violently forced by the current against a large iceberg lying aground.

Our prospect was now more alarming than at any preceding period; and it would be difficult for me to portray the anxiety and dismay depicted on the countenances of the female passengers and children, who were rushing on deck in spite of the endeavours of the officers to keep them below, out of the danger which was apprehended if the masts should be carried away. After the first concussion the ship was driven along the steep and rugged side of this iceberg, with such amazing rapidity, that the destruction of the masts seemed inevitable, and every one expected we should again be forced on the rocks in the most disabled state; but we providentially escaped this perilous result, which must have been decisive.

The dense fog now cleared away for a short time, and we discovered the Eddystone close to some rocks, having three boats employed in towing; but the Wear was not visible.

Our ship received water very fast; the pumps were instantly manned and kept in continual use, and signals of distress were made to the Eddystone, whose commander promptly came on board, and then ordered to our assistance his carpenter and all the men he could spare, together with the carpenter and boat's crew of the Wear, who had gone on board the Eddystone in the morning, and were prevented from returning to their own vessel by the fog. As the wind was increasing, and the sky appeared very unsettled, it was determined the Eddystone should take the ship in tow, that the undivided attention of the passengers and crew might be directed to pumping, and clearing the holds to examine whether there was a possibility of stopping the leak. We soon had reason to suppose the principal injury had been received from a blow near the stern-post, and, after cutting away part of the ceiling, the carpenters endeavoured to stop the rushing in of the water, by forcing oakum between the timbers; but this had not the desired effect, and the leak, in spite of all our efforts at the pumps, increased so much, that parties of the officers and passengers were stationed to bail out the water in buckets at different parts of the hold.

A heavy gale came on, blowing from the land, as the night advanced; the sails were split, the ship was encompassed by heavy ice, and, in forcing through a closely-connected stream, the tow-rope broke, and obliged us to take a portion of the seamen from the pumps, and appoint them to the management of the ship.

Fatigue, indeed, had caused us to relax in our exertions at the pumps during a part of the night of the 8th, and on the following morning upwards of five feet water was found in the well. Renewed exertions were now put forth by every person, and before eight A.M. the water was so much reduced as to enable the carpenters to get at other defective places; but the remedies they could apply were insufficient to repress the water from rushing in, and our labours could but just keep the ship in the same state throughout the day, until six P.M.; when the strength of every one began to fail, the expedient of thrusting in felt, as well as oakum, was resorted to, and a plank nailed over all. After this operation a perceptible diminution in the water was made, and being encouraged by the change, we put forth our utmost exertion in bailing and pumping, and before night, to our infinite joy, the leak was so overpowered that the pumps were only required to be used at intervals of ten minutes. A sail, covered with every substance that could be carried into the leaks by the pressure of the water, was drawn under the quarter of the ship, and secured by ropes on each side.

As a matter of precaution in the event of having to abandon the ship, which was for some time doubtful, the elderly women and children were removed to the Eddystone when the wind was moderate this afternoon, but the young women remained to assist at the pumps, and their services were highly valuable, both for their personal labour, and for the encouragement their example and perseverance gave to the men.

At day-light, on the 9th, every eye was anxiously cast around the horizon in search of the Wear, but in vain; and the recollection of

our own recent peril caused us to entertain considerable apprehensions for her safety. This anxiety quickened our efforts to exchange our shattered sails for new ones, that the ship might be got, as speedily as possible, near to the land, which was but just in sight, and a careful search be made for her along the coast. We were rejoiced to find that our leak did not increase by carrying sail, and we ventured in the evening to remove the sail which had been placed under the part where the injury had been received, as it greatly impeded our advance.

We passed many icebergs on the 10th, and in the evening we tacked from a level field of ice, which extended northward as far as the eye could reach. Our leak remained in the same state; the pumps discharged in three minutes the quantity of water which had been received in fifteen.

The ship could not be got near to the land before the afternoon of the 11th. At four P.M. we hove to, opposite to, and about five miles distant from, the spot on which we had first struck on Saturday. Every glass was directed along the shore (as they had been throughout the day), to discover any trace of our absent consort; but, as none was seen, our solicitude respecting her was much increased, and we feared the crew might be wrecked on this inhospitable shore. Guns were frequently fired to apprize any who might be near of our approach; but, as no one appeared, and no signal was returned, and the loose ice was setting down towards the ship, we bore up to proceed to the next appointed rendezvous. At eight P.M. we were abreast of the S.W. end of the island called Cape Resolution, which is a low point, but indicated at a distance by a lofty round backed hill that rises above it. We entered Hudson's Straits soon afterwards.

The coast of Resolution Island should be approached with caution, as the tides appear to be strong and uncertain in their course. Some dangerous rocks lie above and below the water's edge, at the distance of five or six miles from East Bluff, bearing S. 32° E.

August 12.—Having had a fresh gale through the night, we reached Saddleback Island by noon—the place of rendezvous; and looked anxiously but in vain for the Wear. Several guns were fired, supposing she might be hid from our view by the land; but, as she did not appear, Captain Davidson, having remained two hours, deemed further delay inexpedient, and bore up to keep the advantage of the fair wind. The outline of this island is rugged; the hummock on its northern extremity appeared to me to resemble a decayed martello tower more than a saddle.

Azimuths were obtained this evening that gave the variation 58° 45′ W., which is greater than is laid down in the charts, or than the officers of the Hudson's Bay ships have been accustomed to allow. We arrived abreast of the Upper Savage Island early in the morning, and as the breeze was moderate, the ship was steered as near to the shore as the wind would permit, to give the Esquimaux inhabitants an opportunity of coming off to barter, which they soon embraced.

Their shouts at a distance intimated their approach some time before we descried the canoes paddling towards us; the headmost of them reached us at eleven; these were quickly followed by others, and before noon about forty canoes, each holding one man, were assembled around the two ships. In the afternoon, when we approached nearer to the shore, five or six larger ones, containing the women and children, came up.

The Esquimaux immediately evinced their desire to barter, and displayed no small cunning in making their bargains, taking care not to exhibit too many articles at first. Their principal commodities were, oil, sea-horse teeth, whalebone, seal-skin dresses, caps and boots, deer-skins and horns, and models of their canoes; and they received in exchange small saws, knives, nails, tin-kettles, and needles. It was pleasing to behold the exultation, and to hear the shouts of the whole party, when an acquisition was made by any one; and not a little ludicrous to behold the eagerness with which the fortunate person licked each

article with his tongue, on receiving it, as a finish to the bargain, and an act of appropriation. They in no instance omitted this strange practice, however small the article; the needles even passed individually through the ceremony. The women brought imitations of men, women, animals, and birds, carved with labour and ingenuity out of sea-horse teeth. The dresses, and the figures of the animals, were not badly executed, but there was no attempt at the delineation of the countenances; and most of the figures were without eyes, ears, and fingers, the execution of which would, perhaps, have required more delicate instruments than they possess. The men set most value on saws; *kuttee-swa-bak*, the name by which they distinguish them, was a constant cry. Knives were held next in estimation. An old sword was bartered from the Eddystone, and I shall long remember the universal burst of joy on the happy man's receiving it. It was delightful to witness the general interest excited by individual acquisitions. There was no desire shewn by any one to over-reach his neighbour, or to press towards any part of the ship where a bargain was making, until the person in possession of the place had completed his exchange and removed; and, if any article happened to be demanded from the outer canoes, the men nearest assisted willingly in passing the thing across. Supposing the party to belong to one tribe, the total number of the tribe must exceed two hundred persons, as there were, probably, one hundred and fifty around the ships, and few of these were elderly persons or male children.

Their faces were broad and flat, the eyes were small. The men were in general stout. Some of the younger women and the children had rather pleasing countenances, but the difference between these and the more aged of that sex, bore strong testimony to the effects which a few years produce in this ungenial climate. Most of the party had sore eyes, all of them appeared of a plethoric habit of body; several were observed bleeding at the nose during their stay

near the ship. The men's dresses consisted of a jacket of seal-skin, the trowsers of bear-skin, and several had caps of the white fox-skin. The female dresses were made of the same materials, but differently shaped, having a hood in which the infants were carried. We thought their manner very lively and agreeable. They were fond of mimicking our speech and gestures; but nothing afforded them greater amusement than when we attempted to retaliate by pronouncing any of their words.

The canoes were of seal-skin, and similar in every respect to those used by the Esquimaux in Greenland; they were generally new and very complete in their appointments. Those appropriated to the women are of ruder construction, and only calculated for fine weather; they are, however, useful vessels, being capable of containing twenty persons with their luggage. An elderly man officiates as steersman, and the women paddle, but they have also a mast which carries a sail, made of dressed whale-gut.

When the women had disposed of all their articles of trade they resorted to entreaty; and the putting in practice of many enticing gestures was managed with so much address, as to procure them presents of a variety of beads, needles, and other articles in great demand among females.

It is probable these Esquimaux go from this shore to some part of Labrador to pass the winter, as parties of them have been frequently seen by the homeward-bound Hudson's Bay ships in the act of crossing the Strait.

They appear to speak the same language as the tribe of Esquimaux, who reside near to the Moravian settlements in Labrador; for we perceived they used several of the words which had been given to us by the Missionaries at Stromness.

Towards evening, the Captain, being desirous to get rid of his visitors, took an effectual method by tacking from the shore; our friends then departed apparently in high glee at the harvest they had

reaped. They paddled away very swiftly, and would, doubtless, soon reach the shore though it was distant ten or twelve miles.

Not having encountered any of the ice, which usually arrests the progress of ships in their outward passage through the Straits, and being consequently deprived of the usual means of replenishing our stock of water, which had become short, the Captain resolved on going to the coast of Labrador for a supply. Dr. Richardson and I gladly embraced this opportunity to land, and examine this part of the coast. I was also desirous to observe the variation on shore, as the azimuths which had been taken on board both ships since our entrance into the Straits, had shewn a greater amount than we had been led to expect; but, unluckily, the sun became obscured. The beach consisted of large rolled stones of gneiss and sienite, amongst which many pieces of ice had grounded, and it was with difficulty that we effected a landing in a small cove under a steep cliff. These stones were worn perfectly smooth; neither in the interstices, nor at the bottom of the water, which was very clear, were there any vestiges of sea-weed.

The cliff was from forty to fifty feet high and quite perpendicular, and had at its base a small slip of soil formed of the debris of a bed of clay-slate. From this narrow spot Dr. Richardson collected specimens of thirty different species of plants; and we were about to scramble up a shelving part of the rock, and go into the interior, when we perceived the signal of recal, which the master had caused to be made, in consequence of a sudden change in the appearance of the weather.

On the evening of the 19th, we passed Digges' Islands, the termination of Hudson's Strait. Here the Eddystone parted company, being bound to Moose Factory, at the bottom of the Bay. A strong north wind came on, which prevented our getting round the north end of Mansfield; and, as it continued to blow with equal strength for the next five days, we were most vexatiously detained in beating

along the Labrador coast, and near the dangerous chain of islands, the Sleepers, which are said to extend from the latitude of 60° 10′ to 57° 00′ N. The press of sail, which of necessity we carried, caused the leak to increase, and the pumps were kept in constant use.

A favouring wind at length enabled us, on the 25th, to shape our course across Hudson's Bay. Nothing worthy of remark occurred during this passage, except the rapid decrease in the variation of the magnetic needle, which will be seen in a subsequent table, together with the positions of the different points in Hudson's Straits; near to which we had the opportunity of getting observations. The few remarks respecting the appearance of the land, which we were able to make in our quick passage through these Straits, were transmitted to the Admiralty; but, as they will not be interesting to the general reader, and may not be sufficiently accurate for the guidance of the Navigator, they are omitted in this narrative.

On the 28th we discovered the land to the southward of Cape Tatnam, which is so extremely low, that the tops of the trees were first discerned; the soundings at the time were seventeen fathoms, which gradually decreased to five as the shore was approached. Cape Tatnam is not otherwise remarkable than as being the point from which the coast inclines rather more to the westward towards York Factory.

The opening of the morning of the 30th presented to our view the anchorage at York Flats, and the gratifying sight of a vessel at anchor, which we recognised, after an anxious examination, to be the Wear. A strong breeze blowing from the direction of the Flats, caused the water to be more shallow than usual on the sandy bar, which lies on the seaward side of the anchorage, and we could not get over it before two P.M., when the tide was nearly at its height.

Immediately after our arrival Mr. Williams, the Governor of the Hudson's Bay Company's posts, came on board, accompanied by the

Commander of the Wear. The pleasure we felt in welcoming the latter gentleman can easily be imagined, when it is considered what reason we had for the apprehension that he and his crew had been numbered with the dead. We learnt that one of the larger masses of ice had providentially drifted between the vessel's side and the rocks just at the time he expected to strike, to which he secured her until a breeze sprang up, and enabled him to pursue his voyage.

The Governor acquainted me that he had received information from the Committee of the Hudson's Bay Company of the equipment of the Expedition, and that the officers would come out in the first ship. In the evening Dr. Richardson, Mr. Hood, and I, accompanied the Governor to York Factory, which we reached after dark; it is distant from the Flats seven miles. Early next morning the Governor conferred the honour of a salute on the members of the Expedition.

Having communicated to the Governor the objects of the Expedition, and that I had been directed to consult with him and the senior servants of the Company as to the best mode of proceeding towards the execution of the service, I was gratified by his assurance that his instructions from the Committee directed that every possible assistance should be given to forward our progress, and that he should feel peculiar pleasure in performing this part of his duty. He introduced me at once to Messrs. Charles, Swaine, and Snodie, masters of districts, who, from long residence in the country, were perfectly acquainted with the different modes of travelling, and the obstructions which might be anticipated. At the desire of these gentlemen, I drew up a series of questions on the points on which we required information; to which they had the kindness to return very explicit and satisfactory answers two days afterwards; and on receiving them I requested the Governor to favour me with his sentiments on the same subject in writing, which he delivered to me on the following day.

Having learned that Messrs. Shaw, M'Tavish, and several other partners of the N.W. Company. were under detention at this place, we took the earliest opportunity of visiting them; when, having presented the general circular, and other introductory letters, with which I had been furnished by their agent Mr. Simon M'Gillivray, we received from them the most friendly and full assurance of the cordial endeavours of the wintering partners of their Company to promote the interests of the Expedition. The knowledge we had now gained of the state of the violent commercial opposition existing in the country, rendered this assurance highly gratifying; and these gentlemen added to the obligation by freely communicating the information respecting the interior of the country, which their intelligence and long residence so fully qualified them to give.

I deemed it expedient to issue a memorandum to the officers of the Expedition, strictly prohibiting any interference whatever in the existing quarrels, or any that might arise, between the two Companies; and on presenting it to the principals of both the parties, they expressed their satisfaction at the step I had taken.

The opinions of all the gentlemen were so decidedly in favour of the route by Cumberland House, and through the chain of posts to the Great Slave Lake, that I determined on pursuing it, and immediately communicated my intention to the Governor, with a request that he would furnish me with the means of conveyance for the party as speedily as possible.

It was suggested in my instructions, that we might probably procure a schooner at this place, to proceed north as far as Wager Bay; but the vessel alluded to was lying at Moose Factory, completely out of repair; independently of which, the route directly to the northward, was rendered impracticable by the impossibility of procuring hunters and guides upon the coast.

I found that as the Esquimaux inhabitants had left Churchill a month previous to our arrival, no interpreter from that quarter

could be procured before their return in the following spring. The Governor, however, undertook to forward to us next season the only one amongst them who understood English, if he could be induced to go.

The Governor selected one of the largest of the Company's boats for our use on the journey, and directed the carpenters to commence refitting it immediately; but he was only able to furnish us with a steersman; and we were obliged to make up the rest of the crew with the boatmen brought from Stromness, and our two attendants.

York Factory, the principal depôt of the Hudson's Bay Company, stands on the west bank of Hayes River, about five miles above its mouth, on the marshy peninsula which separates the Hayes and Nelson rivers. The surrounding country is flat and swampy, and covered with willows, poplars, larch, spruce, and birch trees, but the requisition for fuel has expended all the wood in the vicinity of the fort, and the residents have now to send a considerable distance for this necessary material. The soil is alluvial clay and contains imbedded rolled stones. Though the bank of the river is elevated about twenty feet, it is frequently overflown by the spring floods, and large portions of it are annually carried away by the disruption of the ice; by these portions grounding in the stream, several muddy islands have been formed. These interruptions, together with the various collections of stones that are hid at high water render the navigation of the river difficult; but vessels of two hundred tons burthen may be brought through the proper channels as high as the Factory.

The principal buildings are placed in the form of a square, having an octagonal court in the centre; they are two stories in height, and have flat roofs covered with lead. The officers dwell in one portion of this square, and in the other parts the articles of merchandise are kept: the workshops, storehouses for the furs, and the servants' houses, are ranged on the outside of the square, and the whole is

surrounded by a stockade twenty feet high. A platform is laid from the house to the pier on the bank for the convenience of transporting the stones and furs, which is the only promenade the residents have on this marshy spot during the summer season. The few Indians, who now frequent this establishment, belong to the *Swampy Crees*. There were several of them encamped on the outside of the stockade. Their tents were rudely constructed by tying twenty or thirty poles together at the top, and spreading them out at the base so as to form a cone; these were covered with dressed moose-skins. The fire is placed in the centre, and a hole is left for the escape of the smoke. The inmates had a squalid look, and were suffering under the combined afflictions of hooping-cough and measles; but even these miseries did not keep them from an excessive indulgence in the use of spirits, which they unhappily can procure from the traders with too much facility; and they nightly serenaded us with their monotonous drunken songs. Their sickness, at this time, was particularly felt by the traders, this being the season of the year when the exertion of every hunter is required to procure their winter's stock of geese, which resort in immense flocks to the extensive flats in this neighbourhood. These birds, during the summer, retire far to the north, and breed in security; but, when the approach of winter compels them to seek a more southern climate, they generally alight on the marshes of this bay, and fatten there for three weeks or a month, before they take their final departure from the country. They also make a short halt at the same spots in their progress northwards in the spring. Their arrival is welcomed with joy, and the period of the *goose hunt* is one of the most plentiful seasons of the year. The ducks frequent the swamps all the summer.

The weather was extremely unfavourable for celestial observations during our stay, and it was only by watching the momentary appearances of the sun, that we were enabled to obtain fresh rates for the chronometers, and allow for their errors from Greenwich time. The

dip of the needle was observed to be 79° 29′ 07″, and the difference produced by reversing the face of the instrument was 11° 3′ 40″. A succession of fresh breezes prevented our ascertaining the intensity of the magnetic force. The position of York Factory, by our observations, is in latitude 57° 00′ 03″ N., longitude 92° 26′ W. The variation of the compass 6° 00′ 21″ E.

CHAPTER II.

Passage up Hayes', Steel, and Hill Rivers—Cross Swampy Lake—Jack River—Knee Lake and Magnetic Islet—Trout River—Holey Lake—Weepinapannis River—Windy Lake—White-Fall Lake and River—Echemamis and Lea Rivers—Play-Green Lakes—Lake Winipeg—River Saskatchawan—Cross, Cedar, and Pine-Island Lakes—Cumberland House.

1819.
September. ON the 9th of September, our boat being completed, arrangements were made for our departure as soon as the tide, should serve. But, when the stores were brought down to the beach it was found that the boat would not contain them all. The whole, therefore, of the bacon, and part of the flour, rice, tobacco, and ammunition, were returned into the store. The bacon was too bulky an article to be forwarded under any circumstances; but the Governor undertook to forward the rest next season. In making the selection of articles to carry with us, I was guided by the judgment of Governor Williams, who assured me that tobacco, ammunition, and spirits, could be procured in the interior, otherwise I should have been very unwilling to have left these essential articles behind. We embarked at noon, and were honoured with a salute of eight guns and three cheers from the Governor and all the inmates of the fort, assembled to witness our departure. We gratefully returned their cheers, and then made sail, much delighted at having now commenced our voyage into the interior of America. The wind and tide failing us at the distance of six miles above the Factory, and the current being too rapid for using oars to advantage, the crew had to commence tracking, or dragging the boat by a line, to which they were harnessed. This operation is extremely laborious in these rivers. Our men were obliged to walk along the steep declivity of a high bank, rendered at this season soft and slip-

pery by frequent rains, and their progress was often further impeded by fallen trees which, having slipped from the verge of the thick wood above, hung on the face of the bank in a great variety of directions. Notwithstanding these obstacles, however, we advanced at the rate of two miles an hour, one-half of the crew relieving the other at intervals of an hour and a half. The banks of the river, and its islands, composed of alluvial soil, are well covered with pines, larches, poplars, and willows. The breadth of the stream some distance above the Factory is about half a mile, and its depth during this day's voyage varied from three to nine feet.

At sunset we landed, and pitched the tent for the night, having made a progress of twelve miles. A large fire was quickly kindled, supper speedily prepared, and as readily despatched, when we retired with our buffalo robes on, and enjoyed a night of sound repose.

It may here be stated that the survey of the river was made by taking the bearings of every point with a pocket compass, estimating the distances, and making a connected eye-sketch of the whole. This part of the survey was allotted to Messrs. Back and Hood conjointly : Mr. Hood also protracted the route every evening on a ruled map, after the courses and distances had been corrected by observations for latitude and longitude, taken by myself as often as the weather would allow. The extraordinary talent of this young officer in this line of service proved of the greatest advantage to the Expedition, and he continued to perform that duty until his lamented death, with a degree of zeal and accuracy that characterized all his pursuits.

The next morning our camp was in motion at five A.M., and we soon afterwards embarked with the flattering accompaniment of a fair wind: it proved, however, too light to enable us to stem the stream, and we were obliged to resume the fatiguing operation of tracking, sometimes under cliffs so steep that the men could scarcely find a footing, and not unfrequently over spots rendered so miry, by

the small streams that trickled from above, as to be almost impassable. In the course of the day we passed the scene of a very melancholy accident. Some years ago, two families of Indians, induced by the flatness of a small beach, which lay betwixt the cliff and the river, chose it as the site of their encampment. They retired quietly to rest, not aware that the precipice, detached from the bank, and urged by an accumulation of water in the crevice behind, was tottering to its base. It fell during the night, and the whole party was buried under its ruins.

The length of our voyage to-day was, in a direct line, sixteen miles and a quarter, on a S.S.W. course. We encamped soon after sunset, and the tent was scarcely pitched when it began to rain heavily, and continued to do so all night.

Sixteen miles on the 11th, and five on the following morning, brought us to the commencement of Hayes' River, which is formed by the confluence of the Shamattawa and Steel Rivers. Our observations place this spot in latitude 56° 22′ 32″ N., longitude 93° 1′ 37″ W. It is forty-eight miles and a half from York Factory, including the windings of the river. Steel River, through which our course lay, is about three hundred yards wide at its mouth; its banks have more elevation than those of Hayes' River, but they shelve more gradually down to the stream, and afford a tolerably good towing path, which compensates, in some degree, for the rapids and frequent shoals that impede its navigation. We succeeded in getting about ten miles above the mouth of the river, before the close of day compelled us to disembark.

We made an effort, on the morning of the 13th, to stem the current under sail, but as the course of the river was very serpentine, we found that greater progress could be made by tracking. Steel River presents much beautiful scenery; it winds through a narrow, but well-wooded, valley, which at every turn disclosed to us an agreeable variety of prospect, rendered more picturesque by the

effect of the season on the foliage, now ready to drop from the trees. The light yellow of the fading poplars formed a fine contrast to the dark evergreen of the spruce, whilst the willows, of an intermediate hue, served to shade the two principal masses of colour into each other. The scene was occasionally enlivened by the bright purple tints of the dogwood, blended with the browner shades of the dwarf birch, and frequently intermixed with the gay yellow flowers of the shrubby cinquefoil. With all these charms, the scene appeared desolate from the want of the human species. The stillness was so great, that even the twittering of the *whiskey-johneesh*, or cinereous crow, caused us to start. Our voyage to-day was sixteen miles on a S.W. course.

Sept. 19.—We had much rain during the night, and also in the morning, which detained us in our encampment later than usual. We set out as soon as the weather cleared up, and in a short time arrived at the head of Steel River, where it is formed by the junction of Fox and Hill Rivers. These two rivers are nearly of equal width, but the latter is the most rapid. Mr. M'Donald, on his way to Red River, in a small canoe, manned by two Indians, overtook us at this place. It may be mentioned as a proof of the dexterity of the Indians, and the skill with which they steal upon their game, that they had on the preceding day, with no other arms than a hatchet, killed two deer, a hawk, a curlew, and a sturgeon. Three of the Company's boats joined us in the course of the morning, and we pursued our course up Hill River in company. The water in this river was so low, and the rapids so bad, that we were obliged several times, in the course of the day, to jump into the water, and assist in lifting the boat over the large stones which impeded the navigation. The length of our voyage to-day was only six miles and three quarters.

The four boats commenced operations together at five o'clock the following morning; but our boat being overladen, we soon found that

we were unable to keep pace with the others; and therefore proposed to the gentlemen in charge of the Company's boats, that they should relieve us of part of our cargo. This they declined doing, under the plea of not having received orders to that effect, notwithstanding that the circular, with which I was furnished by Governor Williams, strictly enjoined all the Company's servants to afford us every assistance. In consequence of this refusal we dropt behind, and our steersman, who was inexperienced, being thus deprived of the advantage of observing the route followed by the guide, who was in the foremost boat, frequently took a wrong channel. The tow-line broke twice, and the boat was only prevented from going broadside down the stream, and breaking to pieces against the stones, by the officers and men leaping into the water, and holding her head to the current until the line could be carried again to the shore. It is but justice to say, that in these trying situations we received much assistance from Mr. Thomas Swayne, who with great kindness waited for us with the boat under his charge, at such places as he apprehended would be most difficult to pass. We encamped at sunset, completely jaded with toil. Our distance made good this day was twelve miles and a quarter.

The labours of the 16th commenced at half past five, and for some time the difficulty of getting the boats over the rapids was equal to what we experienced yesterday. Having passed a small brook, however, termed *Half-way Creek*, the river became deeper, and although rapid, it was smooth enough to be named by our Orkney boatmen *Still-water*. We were further relieved by the Company's clerks consenting to take a few boxes of our stores into their boats. Still we made only eleven miles in the course of the day.

The banks of Hill River are higher, and have a more broken outline, than those of Steel or Hayes' Rivers. The cliffs of alluvial clay rose in some places to the height of eighty or ninety feet above the stream, and were surmounted by hills about two hundred feet high,

but the thickness of the wood prevented us from seeing far beyond the mere banks of the river.

September 17.—About half past five in the morning we commenced tracking, and soon came to a ridge of rock which extended across the stream. From this place the boat was dragged up several narrow rocky channels, until we came to the Rock-Portage, where the stream, pent in by a range of small islands, forms several cascades. In ascending the river, the boats with their cargoes are carried over one of the islands, but in the descent they are shot down the most shelving of the cascades. Having performed the operations of carrying, launching, and re-stowing the cargo, we plied the oars for a short distance and landed at a depôt called Rock-House. Here we were informed that the rapids in the upper parts of Hill River were much worse and more numerous than those we had passed, particularly in the present season owing to the unusual lowness of the water. This intelligence was very mortifying, especially as the gentlemen in charge of the Company's boats declared that they were unable to carry any part of our stores beyond this place; and the traders, guides, and most experienced of the boatmen, were of opinion, that unless our boat was still further lightened, the winter would put a stop to our progress before we could reach Cumberland House, or any eligible post. Sixteen pieces were therefore necessarily left with Mr. Bunn, the gentleman in charge of the post, to be forwarded by the Athabasca canoes next season, this being their place of rendezvous.

After this we recommenced our voyage, and having pulled nearly a mile, arrived at Borrowick's Fall, where the boat was dragged up with a line, after part of the cargo had been carried over a small portage. From this place to the Mud Portage, a distance of a mile and three quarters, the boats were pushed on with poles against a very rapid stream. Here we encamped, having come seven miles during the day on a S.W. course. We had several snow showers in the course of the day, and the thermometer at bed-time stood at 30°.

Drawn by Lieut. Hood. R.N.

Engraved by Edw.ª Finden.

VIEW FROM MORGAN'S ROCKS OF THE HILL IN HILL RIVER.

On the morning of the 18th, the country was clothed in the livery of winter, a heavy fall of snow having taken place during the night. We embarked at the usual hour, and, in the course of the day, crossed the Point of Rocks and Brassa Portages, and dragged the boats through several minor rapids. In this tedious way we only made good about nine miles.

On Sunday the 19th we hauled the boats up several short rapids, or, as the boatmen term them, expressively enough, *spouts*, and carried them over the Portages of Lower Burntwood and Morgan's Rocks; on the latter of which we encamped, having proceeded, during the whole day, only one mile and three quarters.

The upper part of Hill River swells out considerably, and at Morgan's Rocks, where it is three quarters of a mile wide, we were gratified with a more extensive prospect of the country than any we had enjoyed since leaving York Factory. The banks of the river here, consisting of low flat rocks with intermediate swamps, permitted us to obtain views of the interior, the surface of which is broken into a multitude of cone-shaped hills. The highest of these hills, which gives a name to the river, has an elevation not exceeding six hundred feet. From its summit, thirty-six lakes are said to be visible. The beauty of the scenery, dressed in the tints of autumn, called forth our admiration, and was the subject of Mr. Hood's accurate pencil. On the 20th we passed Upper Burntwood and Rocky Ledge Portages, besides several strong *spouts*; and in the evening arrived at Smooth Rock Portage, where we encamped, having come three miles and a half. It is not easy for any but an eye-witness to form an adequate idea of the exertions of the Orkney boatmen in the navigation of this river. The necessity they are under of frequently jumping into the water to lift the boats over the rocks, compels them to remain the whole day in wet clothes, at a season when the temperature is far below the freezing point. The immense loads too, which they carry over the portages, is not more a matter of

surprise than the alacrity with which they perform these laborious duties.

At six on the morning of the 21st, we left our encampment, and soon after arrived at the Mossy Portage, where the cargoes were carried through a deep bog for a quarter of a mile. The river swells out, above this portage, to the breadth of several miles, and as the islands are numerous there are a great variety of channels. Night overtook us before we arrived at the *Second Portage,* so named from its being the second in the passage down the river. Our whole distance this day was one mile and a quarter.

On the 22d our route led us amongst many wooded islands, which lying in long vistas, produced scenes of much beauty. In the course of the day we crossed the Upper Portage, surmounted the Devil's Landing Place, and urged the boat with poles through Groundwater Creek. At the upper end of this creek, our bowman having given the boat too broad a sheer, to avoid the rock, it was caught on the broadside by the current, and, in defiance of our utmost exertions, hurried down the rapid. Fortunately, however, it grounded against a rock high enough to prevent the current from oversetting it, and the crews of the other boats having come to our assistance, we succeeded, after several trials, in throwing a rope to them, with which they dragged our almost sinking vessel stern foremost up the stream, and rescued us from our perilous situation. We encamped in the dusk of the evening amidst a heavy thunder-storm, having advanced two miles and three quarters.

About ten in the morning of the 23d we arrived at the *Dramstone,* which is hailed with pleasure by the boats' crews, as marking the termination of the laborious ascent of Hill River. We complied with the custom from whence it derives its name, and soon after landing upon Sail Island prepared breakfast. In the mean time our boatmen cut down and rigged a new mast, the old one having been thrown overboard at the mouth of Steel River, where it ceased to be

useful. We left Sail Island with a fair wind, and soon afterwards arrived at a depôt situated on Swampy Lake, where we received a supply of mouldy *pemmican* *. Mr. Calder and his attendant were the only tenants of this cheerless abode, and their only food was the wretched stuff with which they supplied us, the lake not yielding fish at this season. After a short delay at this post, we sailed through the remainder of Swampy Lake, and slept at the Lower Portage in Jack River; the distance sailed to-day being sixteen miles and a half.

Jack River is only eight miles long; but being full of bad rapids, it detained us considerably. At seven in the morning of the 24th, we crossed the Long Portage, where the woods, having caught fire in the summer, were still smoking. This is a common accident, owing to the neglect of the Indians and voyagers in not putting out their fires, and in a dry season the woods may be seen blazing to the extent of many miles. We afterwards crossed the Second, or Swampy Portage, and in the evening encamped on the Upper Portage, where we were overtaken by an Indian bringing an answer from Governor Williams to a letter I had written to him on the 15th, in which he renewed his injunctions to the gentlemen of the boats accompanying us, to afford us every assistance in their power. The Aurora Borealis appeared this evening in form of a bright arch, extending across the zenith in a N.W. and S.E. direction. The extent of our voyage to-day was two miles.

About noon on the 25th we entered Knee Lake, which has a very irregular form, and near its middle takes a sudden turn, from whence it derives its name. It is thickly studded with islands, and its shores are low and well-wooded. The surrounding country, as far as we could see, is flat, being destitute even of the moderate elevations which occur near the upper part of Hill River. The weather was remarkably fine, and the setting sun threw the richest tints over the scene that I remember ever to have witnessed.

* Buffalo meat, dried and pounded, and mixed with melted fat.

About half a mile from the bend or *knee* of the lake, there is a small rocky islet, composed of magnetic iron ore, which affects the magnetic needle at a considerable distance. Having received previous information respecting this circumstance, we watched our compasses carefully, and perceived that they were affected at the distance of three hundred yards, both on the approach to and departure from the rock: on decreasing the distance, they became gradually more and more unsteady, and on landing they were rendered quite useless; and it was evident that the general magnetic influence was totally overpowered by the local attraction of the ore. When Kater's compass was held near to the ground on the N.W. side of the island, the needle dipped so much that the card could not be made to traverse by any adjustment of the hand; but on moving the same compass about thirty yards to the west part of the islet, the needle became horizontal, traversed freely, and pointed to the magnetic north. The dipping needle being landed on the S.W. point of the islet, was adjusted as nearly as possible on the magnetic meridian by the sun's bearings, and found to vibrate freely, when the face of the instrument was directed to the east or west. The mean dip it gave was 80° 37′ 50″. When the instrument was removed from the N.W. to the S.E. point, about twenty yards distant, and placed on the meridian, the needle ceased to traverse, but remained steady at an angle of 60°. On changing the face of the instrument, so as to give a S.E. and N.W. direction to the needle, it hung vertically. The position of the slaty strata of the magnetic ore is also vertical. Their direction is extremely irregular, being much contorted.

Knee Lake towards its upper end becomes narrower, and its rocky shores are broken into conical and rounded eminences, destitute of soil, and of course devoid of trees. We slept at the western extremity of the lake, having come during the day nineteen miles and a half on a S.W. course.

We began the ascent of Trout River early in the morning of the

Drawn by Lieut. Hood, R.N

Engraved by Edw.d Finden.

THE TROUT FALL.

Sept. 1819.

27th, and in the course of the day passed three portages and several rapids. At the first of these portages the river falls between two rocks about sixteen feet, and it is necessary to launch the boat over a precipitous rocky bank. This cascade is named the *Trout-Fall*, and the beauty of the scenery afforded a subject for Mr. Hood's pencil. The rocks which form the bed of this river are slaty, and present sharp fragments, by which the feet of the boatmen are much lacerated. The Second Portage, in particular, obtains the expressive name of *Knife Portage*. The length of our voyage to-day was three miles.

On the 28th we passed through the remainder of Trout River; and, at noon, arrived at Oxford House, on Holey Lake. This was formerly a post of some consequence to the Hudson's Bay Company, but at present it exhibits unequivocal signs of decay. The Indians have of late years been gradually deserting the low or swampy country, and ascending the Saskatchawan, where animals are more abundant. A few Crees were at this time encamped in front of the fort. They were suffering under the combined maladies of hooping-cough and measles, and looked miserably dejected. We endeavoured in vain to prevail on one of them to accompany us for the purpose of killing ducks, which were numerous, but too shy for our sportsmen. We had the satisfaction, however, of exchanging the mouldy pemmican, obtained at Swampy Lake, for a better kind, and received, moreover, a small, but very acceptable, supply of fish. Holey Lake, viewed from an eminence behind Oxford House, exhibits a pleasing prospect; and its numerous islands, varying much in shape and elevation, contribute to break that uniformity of scenery which proves so palling to a traveller in this country. Trout of a great size, frequently exceeding forty pounds weight, abound in this lake. We left Oxford House in the afternoon, and encamped on an island about eight miles distant, having come, during the day, nine miles and a quarter.

At noon, on the 29th, after passing through the remainder of Holey Lake, we entered the Weepinapannis, a narrow grassy river, which runs parallel to the lake for a considerable distance, and forms its south bank into a narrow peninsula. In the morning we arrived at the Swampy Portage, where two of the boats were broken against the rocks. The length of the day's voyage was nineteen miles and a half.

In consequence of the accident yesterday evening, we were detained a considerable time this morning, until the boats were repaired, when we set out, and, after ascending a strong rapid, arrived at the Portage by John Moore's Island. Here the river rushes with irresistible force through the channels formed by two rocky islands; and we learnt, that last year a poor man, in hauling a boat up one of these channels, was, by the breaking of the line, precipitated into the stream and hurried down the cascade with such rapidity, that all efforts to save him were ineffectual. His body was afterwards found and interred near the spot.

The Weepinapannis is composed of several branches which separate and unite, again and again, intersecting the country in a great variety of directions. We pursued the principal channel, and having passed the Crooked Spout, with several inferior rapids, and crossed a small piece of water, named Windy Lake, we entered a smooth deep stream about three hundred yards wide, which has got the absurd appellation of the Rabbit Ground. The marshy banks of this river are skirted by low barren rocks, behind which there are some groups of stunted trees. As we advanced, the country becoming flatter, gradually opened to our view, and we at length arrived at a shallow, reedy lake, the direct course through which leads to the Hill Portage. This route has, however, of late years been disused, and we therefore turned towards the north, and crossing a small arm of the lake, arrived at Hill Gates by sunset; having come this day eleven miles.

October 1.—Hill Gates is the name imposed on a romantic defile,

whose rocky walls rising perpendicularly to the height of sixty or eighty feet, hem in the stream for three quarters of a mile, in many places so narrowly, that there is a want of room to ply the oars. In passing through this chasm we were naturally led to contemplate the mighty but, probably, slow and gradual effects of the water in wearing down such vast masses of rock; but in the midst of our speculations, the attention was excited anew to a grand and picturesque rapid, which, surrounded by the most wild and majestic scenery, terminated the defile. The brown fishing-eagle had built its nest on one of the projecting cliffs. In the course of the day we surmounted this and another dangerous portage, called the Upper and Lower Hill Gate Portages, crossed a small sheet of water, termed the White-Fall Lake, and entering the river of the same name, arrived at the White Fall about an hour after sunset, have come fourteen miles on a S.W. course.

The whole of the 2d of October was spent in carrying the cargoes over a portage of thirteen hundred yards in length, and in launching the empty boats over three several ridges of rock which obstruct the channel and produce as many cascades. I shall long remember the rude and characteristic wildness of the scenery which surrounded these falls; rocks piled on rocks hung in rude and shapeless masses over the agitated torrents which swept their bases, whilst the bright and variegated tints of the mosses and lichens, that covered the face of the cliffs, contrasting with the dark green of the pines, which crowned their summits, added both beauty and grandeur to the general effect of the scene. Our two companions, Back and Hood, made accurate sketches of these falls. At this place we observed a conspicuous *lop-stick*, a kind of land-mark, which I have not hitherto noticed, notwithstanding its great use in pointing out the frequented routes. It is a pine-tree divested of its lower branches, and having only a small tuft at the top remaining. This operation is usually performed at the instance of some individual emulous of fame. He

treats his companions with rum, and they in return, strip the tree of its branches, and ever after designate it by his name.

In the afternoon, whilst on my way to superintend the operations of the men, a stratum of loose moss gave way under my feet, and I had the misfortune to slip from the summit of a rock into the river, betwixt two of the falls. My attempts to regain the bank were, for a time, ineffectual, owing to the rocks within my reach having been worn smooth by the action of the water, but after I had been carried a considerable distance down the stream, I caught hold of a willow, by which I held until two gentlemen of the Hudson's Bay Company came in a boat to my assistance. The only bad consequence of this accident was an injury sustained by a very valuable chronometer, (No. 1733,) belonging to Daniel Moore, Esq., of Lincoln's Inn. One of the gentlemen, to whom I delivered it immediately on landing, in his agitation let it fall, whereby the minute-hand was broken, but the works were not in the smallest degree injured, and the loss of the hand was afterwards supplied.

During the night the frost was severe, and at sun-rise, on the 3d, the thermometer stood at 25°. After leaving our encampment at the White Fall, we passed through several small lakes connected with each other by narrow, deep, grassy streams, and at noon arrived at the Painted Stone. Numbers of musk-rats frequent these streams, and we observed, in the course of the morning, many of their mud-houses rising in a conical form to the height of two or three feet above the grass of the swamps in which they are built.

The Painted Stone is a low rock, ten or twelve yards across, remarkable for the marshy streams which arise on each side of it, taking different courses. On the one side, the water-course which we had navigated from York Factory commences. This spot may therefore be considered as one of the smaller sources of Hayes' River. On the other side of the stone the Echemamis arises, and taking a westerly direction falls into Nelson River. It is said that there was formerly

a stone placed near the centre of this portage on which figures were annually traced, and offerings deposited, by the Indians; but the stone has been removed many years, and the spot has ceased to be held in veneration. Here we were overtaken by Governor Williams, who left York Factory on the 20th of last month in an Indian canoe. He expressed much regret at our having been obliged to leave part of our stores at the Rock depôt, and would have brought them up with him had he been able to procure and man a boat, or a canoe of sufficient size.

Having launched the boats over the rock, we commenced the descent of the Echemamis. This small stream has its course through a morass, and in dry seasons its channel contains, instead of water, merely a foot or two of thin mud. On these occasions it is customary to build dams, that it may be rendered navigable by the accumulation of its waters. As the beavers perform this operation very effectually, endeavours have been made to encourage them to breed in this place, but it has not hitherto been possible to restrain the Indians from killing that useful animal whenever they discover its retreats. On the present occasion there was no want of water, the principal impediment we experienced being from the narrowness of the channel, which permitted the willows of each bank to meet over our heads, and obstruct the men at the oars. After proceeding down the stream for some time, we came to a recently constructed beaver-dam through which an opening was made sufficient to admit the boat to pass. We were assured that the breach would be closed by the industrious creature in a single night. We encamped about eight miles from the source of the river, having come during the day seventeen miles and a half.

On the 4th we embarked amidst a heavy rain, and pursued our route down the Echemamis. In many parts the morass, by which the river is nourished, and through which it flows, is intersected by ridges of rock which cross the channel, and require the boat to be

lifted over them. In the afternoon we passed through a shallow piece of water overgrown with bulrushes, and hence named Hairy Lake; and, in the evening, encamped on the banks of Blackwater-Creek, by which this lake empties itself into Sea River; having come during the day twenty miles and three quarters.

On the morning of the 5th, we entered Sea River, one of the many branches of Nelson River. It is about four hundred yards wide, and its waters are of a muddy white colour. After ascending the stream for an hour or two, and passing through Carpenter's Lake, which is merely an expansion of the river to about a mile in breadth, we came to the Sea River Portage, where the boat was launched across a smooth rock, to avoid a fall of four or five feet. Re-embarking at the upper end of the portage, we ran before a fresh gale through the remainder of Sea River, the lower part of Play Green Lake, and entering Little Jack River, landed and pitched our tents. Here there is a small log-hut, the residence of a fisherman, who supplies Norway House with trout and sturgeon. He gave us a few of these fish, which afforded an acceptable supper. The length of our voyage this day was thirty-four miles.

October 6.—Little Jack River is the name given to a channel that winds among several large islands which separate Upper and Lower Play Green Lakes. At the lower end of this channel, Big Jack River, a stream of considerable magnitude, falls into the lake. Play Green is a translation of the appellation given to that lake by two bands of Indians, who met and held a festival on an island situated near its centre. After leaving our encampment we sailed through Upper Play Green Lake, and arrived at Norway Point in the forenoon.

The waters of Lake Winipeg, and of the rivers that run into it, the Saskatchawan in particular, are rendered turbid by the suspension of a large quantity of white clay. Play Green Lake and Nelson River, being the discharges of the Winipeg, are equally opaque, a

circumstance that renders the sunken rocks, so frequent in these waters, very dangerous to boats in a fresh breeze. Owing to this, one of the boats that accompanied us, sailing at the rate of seven miles an hour, struck upon one of these rocks. Its mast was carried away by the shock, but fortunately no other damage sustained. The Indians ascribe the muddiness of these lakes to an adventure of one of their deities, a mischievous fellow, a sort of Robin Puck, whom they hold in very little esteem. This deity, who is named Weesakootchaht, possesses considerable power, but makes a capricious use of it, and delights in tormenting the poor Indians. He is not, however, invincible, and was foiled in one of his attempts by the artifice of an old woman, who succeeded in taking him captive. She called in all the women of the tribe to aid in his punishment, and he escaped from their hands in a condition so filthy that it required all the waters of the Great Lake to wash him clean; and ever since that period it has been entitled to the appellation of Winipeg, or Muddy Water.

Norway Point forms the extremity of a narrow peninsula which separates Play Green and Winipeg Lakes. Buildings were first erected here by a party of Norwegians, who were driven away from the colony at Red River by the commotions which took place some time ago. It is now a trading post belonging to the Hudson's Bay Company. On landing at Norway House we met with Lord Selkirk's colonists, who had started from York Factory the day before us.—These poor people were exceedingly pleased at meeting with us again in this wild country; having accompanied them across the Atlantic, they viewed us in the light of old acquaintances. This post was under the charge of Mr. James Sutherland, to whom I am indebted for replacing a minute-hand on the chronometer, which was broken at the White Fall, and I had afterwards the satisfaction of finding that it went with extraordinary regularity.

The morning of the 7th October was beautifully clear, and the observations we obtained place Norway House in latitude 53° 41′ 38″ N.,

and longitude 98° 1′ 24″ W.; the variation of the magnetic needle 14° 12′ 41″ E., and its dip 83° 40′ 10″. The dip, it will be perceived, has gradually increased, though our route from York Factory has rather inclined to the S.W. The difference produced by reversing the face of the instrument was 7° 39′. There was too much wind to admit of our observing, with any degree of accuracy, the quantity of the magnetic force.

We left Norway House soon after noon, and the wind being favourable, sailed along the northern shore of Lake Winipeg the whole of the ensuing night; and on the morning of the 8th landed on a narrow ridge of sand, which, running out twenty miles to the westward, separates Limestone Bay from the body of the Lake. When the wind blows hard from the southward, it is customary to carry boats across this isthmus, and to pull up under its lee. From Norwegian Point to Limestone Bay the shore consists of high clay cliffs, against which the waves beat with much violence during strong southerly winds. When the wind blows from the land, and the waters of the lake are low, a narrow sandy beach is uncovered, and affords a landing-place for boats. The shores of Limestone Bay are covered with small fragments of calcareous stones. During the night the Aurora Borealis was quick in its motions, and various and vivid in its colours. After breakfasting we re-embarked, and continued our voyage until three P.M., when a strong westerly wind arising, we were obliged to shelter ourselves on a small island, which lies near the extremity of the above-mentioned peninsula. This island is formed of a collection of small rolled pieces of limestone, and was remembered by some of our boatmen to have been formerly covered with water. For the last ten or twelve years the waters of the lake have been low, but our information did not enable us to judge whether the decrease was merely casual, or going on continually, or periodical. The distance of this island from Norway House is thirty-eight miles and a half.

The westerly winds detained us all the morning of the 9th, but, at two P.M., the wind chopped round to the eastward; we immediately embarked, and the breeze afterwards freshening, we reached the mouth of the Saskatchawan at midnight, having run thirty-two miles.

Sunday, October 10.—The whole of this day was occupied in getting the boats from the mouth of the river to the foot of the grand rapid, a distance of two miles. There are several rapids in this short distance, during which the river varies its breadth from five hundred yards to half a mile. Its channel is stony. At the grand rapid, the Saskatchawan forms a sudden bend, from south to east, and works its way through a narrow channel, deeply worn into the limestone strata. The stream, rushing with impetuous force over a rocky and uneven bottom, presents a sheet of foam, and seems to bear with impatience the straitened confinement of its lofty banks. A flock of pelicans, and two or three brown fishing eagles, were fishing in its agitated waters, seemingly with great success. There is a good sturgeon fishery at the foot of the rapid. Several golden plovers, Canadian gros-beaks, cross-bills, wood-peckers, and pin-tailed grouse, were shot to-day; and Mr. Back killed a small striped marmot. This beautiful little animal was busily employed in carrying in its distended pouches the seeds of the American vetch to its winter hoards.

The portage is eighteen hundred yards long, and its western extremity was found to be in 53° 08′ 25″ North latitude, and 99° 28′ 02″ West longitude. The route from Canada to the Athabasca joins that from York Factory at the mouth of the Saskatchawan, and we saw traces of a recent encampment of the Canadian voyagers. Our companions in the Hudson's Bay boats, dreading an attack from their rivals in trade, were on the alert at this place. They examined minutely the spot of encampment, to form a judgment of the number of canoes that had preceded them; and they advanced, armed,

and with great caution, through the woods. Their fears, however, were fortunately, on this occasion, groundless.

By noon, on the 12th, the boats and their cargoes having been conveyed across the portage, we embarked, and pursued our course. The Saskatchawan becomes wider above the Grand Rapid, and the scenery improves. The banks are high, composed of white clay and limestone, and their summits are richly clothed with a variety of firs, poplars, birches, and willows. The current runs with great rapidity, and the channel is, in many places, intricate and dangerous, from broken ridges of rock jutting into the stream. We pitched our tents at the entrance of Cross Lake, having advanced only five miles and a half.

Cross Lake is extensive, running towards the N.E., it is said, for forty miles. We crossed it at a narrow part, and pulling through several winding channels, formed by a group of islands, entered Cedar Lake, which, next to Lake Winipeg, is the largest sheet of fresh water we had hitherto seen. Ducks and geese resort hither in immense flocks in the spring and autumn. These birds are now beginning to go off, owing to its muddy shores having become quite hard through the nightly frosts. At this place the Aurora Borealis was extremely brilliant in the night, its coruscations darting, at times, over the whole sky, and assuming various prismatic tints, of which the violet and yellow were predominant.

After pulling, on the 14th, seven miles and a quarter on the lake, a violent wind drove us for shelter to a small island, or rather a ridge of rolled stones, thrown up by the frequent storms which agitate this lake. The weather did not moderate the whole day, and we were obliged to pass the night on this exposed spot. The delay, however, enabled us to obtain some lunar observations. The wind having subsided, we left our resting-place the following morning, crossed the remainder of the lake; and, in the afternoon, arrived at Muddy Lake, which is very appropriately named, as it consists

merely of a few channels, winding amongst extensive mud banks, which are overflowed during the spring floods. We landed at an Indian tent, which contained two numerous families, amounting to thirty souls. These poor creatures were badly clothed, and reduced to a miserable condition by the ravages of the hooping-cough and measles. At the time of our arrival they were busy in preparing a sweating-house for the sick. This is a remedy, which they consider, with the addition of singing and drumming, to be the grand specific for all diseases. Our companions having obtained some geese, in exchange for rum and tobacco, we proceeded a few more miles, and encamped on Devil's Drum Island, having come, during the day, twenty miles and a half. A second party of Indians were encamped on an adjoining island, a situation chosen for the purpose of killing geese and ducks.

On the 16th we proceeded eighteen miles up the Saskatchawan. Its banks are low, covered with willows, and lined with drift timber. The surrounding country is swampy, and intersected by the numerous arms of the river. After passing for twenty or thirty yards through the willow thicket on the banks of the stream, we entered upon an extensive marsh, varied only by a distant line of willows, which marks the course of a creek or branch of the river. The branch we navigated to-day is almost five hundred yards wide. The exhalations from the marshy soil produced a low fog, although the sky above was perfectly clear. In the course of the day we passed an Indian encampment of three tents, whose inmates appeared to be in a still more miserable condition than those we saw yesterday. They had just finished the ceremony of conjuration over some of their sick companions; and a dog, which was recently killed as a sacrifice to some deity, was hanging to a tree, where it would be left (I was told) when they moved their encampment.

We continued our voyage up the river to the 20th with little variation of scenery or incident, travelling in that time about thirty

miles. The near approach of winter was marked by severe frosts, which continued all day unless when the sun chanced to be unusually bright, and the geese and ducks were observed to take a southerly course in large flocks. On the morning of the 20th we came to a party of Indians, encamped behind the bank of the river on the borders of a small marshy lake, for the purpose of killing water-fowl. Here we were gratified with the view of a very large tent. Its length was about forty feet, its breadth eighteen, and its covering was moose deer leather, with apertures for the escape of the smoke from the fires which were placed at each end; a ledge of wood was placed on the ground on both sides the whole length of the tent, within which were the sleeping places, arranged probably according to families; and the drums and other instruments of enchantment were piled up in the centre. Amongst the Indians there were a great many half-breeds, who led an Indian life. Governor Williams gave a dram and a piece of tobacco to each of the males of the party.

On the morning of the 21st a heavy fall of snow took place, which lasted until two in the afternoon. In the evening we left the Saskatchawan, and entered the Little River, one of the two streams by which Pine Island Lake discharges its waters. We advanced to-day fourteen miles and a quarter. On the 22d the weather was extremely cold and stormy, and we had to contend against a strong head wind. The spray froze as it fell, and the oars were so loaded with ice as to be almost unmanageable. The length of our voyage this day was eleven miles.

The following morning was very cold; we embarked at day-light, and pulled across a part of Pine Island Lake, about three miles and a half to Cumberland House. The margin of the lake was so encrusted with ice, that we had to break through a considerable space of it to approach the landing place. When we considered that this was the effect of only a few days' frost at the commencement of winter, we were convinced of the impracticability of advancing further by water

this season, and therefore resolved on accepting Governor Williams's kind invitation to remain with him at this post. We immediately visited Mr. Connolly, the resident partner of the North-West Company, and presented to him Mr. Mac Gillivray's circular letter. He assured us that he should be most desirous to forward our progress by every means in his power, and we subsequently had ample proofs of his sincerity and kindness. The unexpected addition of our party to the winter residents at this post, rendered an increase of apartments necessary; and our men were immediately appointed to complete and arrange an unfinished building as speedily as possible.

November 8.—Some mild weather succeeded to the severe frosts we had at our arrival; and the lake had not been entirely frozen before the 6th; but this morning the ice was sufficiently firm to admit of sledges crossing it. The dogs were harnessed at a very early hour, and the winter operations commenced by sending for a supply of fish from Swampy River, where men had been stationed to collect it, just before the frost set in. Both men and dogs appeared to enjoy the change; they started in full glee, and drove rapidly along. An Indian, who had come to the house on the preceding evening to request some provision for his family, whom he represented to be in a state of starvation, accompanied them. His party had been suffering greatly under the epidemic diseases of the hooping-cough and measles; and the hunters were still in too debilitated a state to go out and provide them with meat. A supply was given to him, and the men were directed to bring his father, an old and faithful hunter, to the house, that he might have the comforts of nourishment and warmth. He was brought accordingly, but these attentions were unavailing as he died a few days afterwards. Two days before his death I was surprised to observe him sitting for near three hours, in a piercingly sharp day, in the saw-pit, employed in gathering the dust, and throwing it by handfuls over his body, which was naked to the waist. As the man was in possession of his mental faculties, I conceived he was per-

forming some devotional act preparatory to his departure, which he felt approaching; and, induced by the novelty of the incident, I went twice to observe him more closely; but when he perceived that he was noticed, he immediately ceased his operation, hung down his head, and by his demeanour, intimated that he considered my appearance an intrusion. The residents at the fort could give me no information on the subject, and I could not learn that the Indians in general observe any particular ceremony on the approach of death.

November 15.—The sky had been overcast during the last week; the sun shone forth once only, and then not sufficiently for the purpose of obtaining observations. Faint coruscations of the Aurora Borealis appeared one evening, but their presence did not in the least affect the electrometer nor the compass. The ice daily became thicker in the lake, and the frost had now nearly overpowered the rapid current of the Saskatchawan River; indeed, parties of men who were sent from both the forts to search for the Indians, and procure whatever skins and provisions they might have collected, crossed that stream this day on the ice; the white partridges made their first appearance near to the house. These birds are considered as the infallible harbingers of severe weather.

Monday, November 22.—The Saskatchawan, and every other river, were now completely covered with ice, except a small stream near to the fort through which the current ran very powerfully. In the course of the week we removed into the house our men had been preparing for us since our arrival. We found it at first extremely cold notwithstanding a good fire was kept in each aparment, and we frequently experienced the extremes of heat and cold on opposite sides of the body.

November 24.—We this day obtained observations for the dip of the needle and intensity of the magnetic force in a spare room. The dip was 83° 9′ 45″, and the difference produced by reversing the face of the instrument 13° 3′ 6″. When the needle was faced to the west

it hung nearly perpendicular. The Aurora Borealis was faintly visible for a short time last evening. Some Indians arrived in search of provision, having been totally incapacitated from hunting by sickness; the poor creatures looked miserably ill, and they represented their distress to have been extreme. Few recitals are more affecting than those of their sufferings during unfavourable seasons, and in bad situations for hunting and fishing. Many assurances have been given me that men and women are yet living who have been reduced to feed upon the bodies of their own family, to prevent actual starvation; and a shocking case was cited to us of a woman who had been principal agent in the destruction of several persons, and amongst the number her husband and nearest relatives, in order to support life.

November 28.—The atmosphere had been clear every day during the last week, about the end of which snow fell, when the thermometer rose from 20° below to 16° above zero. The Aurora Borealis was twice visible, but faint on both occasions. Its appearance did not affect the electrometer, nor could we perceive the compass to be disturbed.

The men brought supplies of moose meat from the hunter's tent, which is pitched near the Basquiau Hill, at the distance of forty or fifty miles from the house, and from whence the greatest part of the meat is procured. The residents have to send nearly the same distance for their fish, and on this service horse-sledges are used. Nets are daily set in Pine Island Lake which occasionally procure some fine sturgeon, tittameg and trout, but not more than sufficient to supply the officers' table.

December 1.—This day was so remarkably fine, that we procured another set of observations for the dip of the needle in the open air; the instrument being placed firmly on a rock, the results gave 83° 14′ 22″. The change produced by reversing the face of the instrument was 12° 50′ 55″.

There was a determined thaw during the last three days, which caused the Saskatchawan River, and some parts of the lake, to break up, and rendered the travelling across either of them dangerous. On this account the absence of Wilks, one of our men, caused no small anxiety. He had incautiously undertaken the charge of conducting a sledge and dogs, in company with a person, going to Swampy River for fish. On their return, being unaccustomed to driving, he became fatigued, and seated himself on his sledge, in which situation his companion left him, presuming that he would soon rise and hasten to follow his track. He however returned safe in the morning, and reported that, foreseeing night would set in before he could get across the lake, he prudently retired into the woods before dark, where he remained until daylight; when the men, who had been despatched to look for him, met him returning to the house, shivering with cold, he having been unprovided with the materials for lighting a fire; which an experienced voyager never neglects to carry.

We had mild weather until the 20th of December. On the 13th there had been a decided thaw, which caused the Saskatchawan, which had again frozen, to re-open, and the passage across it was interrupted for two days. We now received more agreeable accounts from the Indians, who are recovering strength, and beginning to hunt a little; but it is generally feared that their spirits have been so much depressed by the loss of their children and relatives, that the season will be far advanced before they can be roused to any exertion in searching for animals beyond what may be necessary for their own support. It is much to be regretted that these poor men, during their long intercourse with Europeans, have not been taught how pernicious is the grief which produces total inactivity, and that they have not been furnished with any of the consolations which the Christian religion never fails to afford. This, however, could hardly have been expected from persons who have permitted their own offspring, the half-casts, to remain in lamentable ignorance on a subject

of such vital importance. It is probable, however, that an improvement will soon take place among the latter class, as Governor Williams proposes to make the children attend a Sunday school, and has already begun to have divine service performed at his post.

The conversations which I have had with the gentlemen in charge of these posts, convinced me of the necessity of proceeding during the winter into the Athabasca department, the residents of which are best acquainted with the nature and resources of the country lying to the north of the Great Slave Lake; and from whence only guides, hunters, and interpreters can be procured. I had previously written to the partners of the North West Company in that quarter, requesting their assistance in forwarding the Expedition, and stating what we should require of them; but, on reviewing the matter, and reflecting upon the accidents that might delay these letters on the road, I determined on proceeding to the Athabasca as soon as I possibly could, and communicated my intention to Governor Williams and Mr. Connolly, with a request that I might be furnished, by the middle of January, with the means of conveyance for three persons, intending that Mr. Back and Hepburn should accompany me, whilst Dr. Richardson and Mr. Hood remained till the spring at Cumberland House.

After the 20th December the weather became cold, the thermometer constantly below zero. Christmas-day was particularly stormy; but the gale did not prevent the full enjoyment of the festivities which are annually given at Cumberland House on this day. All the men who had been despatched to different parts in search of provision or furs returned to the fort on the occasion, and were regaled with a substantial dinner and a dance in the evening.

1820. January 1. The new year was ushered in by repeated discharges of musketry; a ceremony which has been observed by the men of both the trading Companies for many years. Our party dined with Mr. Connolly, and were regaled with a beaver, which we found

extremely delicate. In the evening his men were entertained with a dance, in which the Canadians exhibited some grace and much agility; and they contrived to infuse some portion of their activity and spirits into the steps of their female companions. The half-breed women are passionately fond of this amusement, but a stranger would imagine the contrary on witnessing their apparent want of animation. On such occasions they affect a sobriety of demeanour which I understand to be the very opposite to their general character.

January 10.—This day I wrote to Governor Williams and Mr. Connolly, requesting them to prepare two canoes, with crews and appointments, for the conveyance of Dr. Richardson and Mr. Hood with the stores to Chipewyan as soon as the navigation should open, and had the satisfaction of receiving from both these gentlemen renewed assurances of their desire to promote the objects of the Expedition. I conceived it to be necessary, previous to my departure, to make some arrangement respecting the men who were engaged at Stromness. Only one of them was disposed to extend his engagement, and proceed beyond the Athabasca Lake; and, as I found there was much uncertainty whether the remaining three could get from the Athabasca to York Factory sufficiently early to secure them a passage in the next Hudson's Bay ship, I resolved not to take them forward, unless Dr. Richardson and Mr. Hood should fail in procuring other men from these establishments next spring, but to despatch them down to York to bring up our stores to this place: after which they might return to the coast in time to secure their passage in the first ship.

I delivered to Dr. Richardson and Mr. Hood a memorandum, containing the arrangements which had been made with the two Companies, respecting their being forwarded in the spring, and some other points of instruction for their guidance in my absence; together with directions to forward the map of our route, which had

been finished, since our arrival, by Mr. Hood, the drawings and the collections of natural history, by the first opportunity to York Factory, for conveyance to England *.

The houses of the two Companies, at this post, are situated close to each other, at the upper extremity of a narrow island, which separates Pine Island Lake from the Saskatchawan River, and are about two miles and three quarters distant from the latter, in a northern direction. They are log-houses, built without much attention to comfort, surrounded by lofty stockades, and flanked with wooden bastions. The difficulty of conveying glass into the interior has precluded the use of that material in the construction of the windows, and its place is poorly supplied by parchment, imperfectly made by the native women from the skin of the rein-deer. Should this post, however, continue to be the residence of Governor Williams, it will be much improved in a few years, as he is devoting his attention to that point. The land around Cumberland House is low, but the soil, from having a considerable intermixture of limestone, is good, and capable of producing abundance of corn, and vegetables of every description. Many kinds of pot-herbs have already been brought to some perfection, and the potatoes bid fair to equal those of England. The spontaneous productions of nature would afford ample nourishment for all the European animals. Horses feed extremely well even during the winter, and so would oxen, if provided with hay, which may be easily done †. Pigs also improve, but require

* As Samuel Wilks, who had accompanied the Expedition from England, proved to be quite unequal to the fatigue of the journey, I directed him to be discharged in the spring, and sent to England by the next ship.

† "The wild buffalo scrapes away the snow with its feet to get at the herbage beneath, and the horse, which was introduced by the Spanish invaders of Mexico, and may be said to have become naturalized, does the same; but it is worthy of remark, that the ox, more lately brought from Europe, has not yet acquired an art so necessary for procuring its food."—(Extract from Dr. Richardson's Journal.)

to be kept warm in the winter. Hence it appears, that the residents might, with common attention, render themselves far less dependant on the Indians for support, and be relieved from the great anxiety which they too often suffer when the hunters are unsuccessful. The neighbourhood of the houses has been much cleared of wood, from the great demand for fuel; there is, therefore, little to admire in the surrounding scenery, especially in its winter garb; few animated objects occur to enliven the scene; an occasional fox, marten, rabbit, or wolf, and a few birds, contribute the only variety. The birds which remained, were ravens, magpies, partridges, crossbills, and woodpeckers. In this universal stillness, the residents at a post feel little disposed to wander abroad, except when called forth by their occupations; and as ours were of a kind best performed in a warm room, we imperceptibly acquired a sedentary habit. In going out, however, we never suffered the slightest inconvenience from the change of temperature, though the thermometer, in the open air, stood occasionally thirty degrees below zero.

The tribe of Indians who reside in the vicinity, and frequent these establishments, is that of the Crees, or Knisteneaux. They were formerly a powerful and numerous nation, which ranged over a very extensive country, and were most successful in their predatory excursions against their neighbours, particularly the northern Indians, and some tribes on the Saskatchawan and Beaver Rivers; but they have long ceased to be held in any fear, and are now, perhaps, the most harmless and inoffensive of the whole Indian race. This change is entirely to be attributed to their intercourse with Europeans; and the vast reduction in their numbers occasioned, I fear, in a considerable degree, by the injudicious introduction amongst them of ardent spirits. They are so passionately fond of this poison, that they will make any sacrifice to obtain it. They are esteemed good hunters,

and are generally assiduous in the occupation. Having laid the bow and arrow altogether aside, and the use of snares, except for rabbits and partridges, they depend entirely on the Europeans for the means of gaining their subsistence, as they require guns, and a constant supply of powder and shot; so that these Indians are probably more completely under the power of the trader than any of the other tribes. As I only saw a few straggling parties of them during short intervals, and under unfavourable circumstances of sickness and famine, I am unable to give, from personal observation, any account of their manners and customs; I must refer the reader, therefore, to Dr. Richardson's account of them, which will be found in the following chapter. That gentleman, during his longer residence at the post, had many opportunities of seeing the natives, and made considerable progress in their language.

January 17.—This morning the sporting part of our society had rather a novel diversion: intelligence having been brought that a wolf had borne away a steel trap, in which he had been caught, a party went in search of the marauder, and took two English bull-dogs and a terrier, which had been brought into the country this season. On the first sight of the animal the dogs became alarmed, and stood barking at a distance, and probably would not have ventured to advance, had they not seen the wolf fall by a shot from one of the gentlemen; they then, however, went up, and behaved courageously, and were enraged by the bites they received. The wolf soon died of its wounds, and the body was brought to the house, where a drawing of it was taken by Mr. Hood, and the skin preserved by Dr. Richardson. Its general features bore a strong resemblance to many of the dogs about the fort, but it was larger, and had a more ferocious aspect. Mr. Back and I were too much occupied in preparing for our departure on the following day to join this excursion.

The position of Cumberland House, by our observations, is, latitude 53° 56′ 40″ N., longitude 102° 16′ 41″ W., by the chronometers; variation 17° 17′ 29″ E., dip of the needle, 83° 12′ 50″. The whole of the travelling distance between York Factory and Cumberland House is about six hundred and ninety miles.

CHAPTER III.

Dr. Richardson's Residence at Cumberland House—His Account of the Cree Indians.

1820. January 19. FROM the departure of Messrs. Franklin and Back, on the 19th of January for Chepewyan, until the opening of the navigation in the spring, the occurrences connected with the Expedition were so much in the ordinary routine of a winter's residence at Fort Cumberland, that they may be, perhaps, appropriately blended with the following general but brief account of that district and its inhabitants.

Cumberland House was originally built by Hearne, a year or two after his return from the Coppermine River, and has ever since been considered by the Hudson's Bay Company as a post of considerable importance. Previous to that time, the natives carried their furs down to the shores of Hudson's Bay, or disposed of them nearer home to the French Canadian traders, who visited this part of the country as early as the year 1697.

The Cumberland House district, extending about one hundred and fifty miles from east to west along the banks of the Saskatchawan, and about as far from north to south, comprehends, on a rough calculation, upwards of twenty thousand square miles, and is frequented at present by about one hundred and twenty Indian hunters. Of these a few have several wives, but the majority have only one, and as some are unmarried, we shall not err greatly in considering the number of married women as only slightly exceeding that of the

hunters. The women marry very young, have a custom of suckling their children for several years, and are besides exposed constantly to fatigue and often to famine; hence they are not prolific, bearing upon an average not more than four children, of whom two may attain the age of puberty. Upon these data, the amount of each family may be stated at five, and the whole Indian population in the district at five hundred.

This is but a small population for such an extent of country, yet their mode of life occasionally subjects them to great privations. The winter of our residence at Cumberland House proved extremely severe to the Indians. The hooping-cough made its appearance amongst them in the autumn, and was followed by the measles, which, in the course of the winter spread through the tribe. Many died, and most of the survivors were so enfeebled as to be unable to pursue the necessary avocations of hunting and fishing. Even those who experienced only a slight attack, or escaped the sickness altogether, dispirited by the scenes of misery which environed them, were rendered incapable of affording relief to their distressed relations, and spent their time in conjuring and drumming to avert the pestilence. Those who were able came to the fort and received relief, but many who had retired with their families to distant corners, to pursue their winter hunts, experienced all the horrors of famine. One evening, early in the month of January, a poor Indian entered the North-West Company's House, carrying his only child in his arms, and followed by his starving wife. They had been hunting apart from the other bands, had been unsuccessful, and whilst in want were seized with the epidemical disease. An Indian is accustomed to starve, and it is not easy to elicit from him an account of his sufferings. This poor man's story was very brief; as soon as the fever abated, he set out with his wife for Cumberland House, having been previously reduced to feed on the bits of skin and offal, which remained about their encampment. Even this

miserable fare was exhausted, and they walked several days without eating, yet exerting themselves far beyond their strength that they might save the life of the infant. It died almost within sight of the house. Mr. Connolly, who was then in charge of the post, received them with the utmost humanity, and instantly placed food before them; but no language can describe the manner in which the miserable father dashed the morsel from his lips and deplored the loss of his child. Misery may harden a disposition naturally bad, but it never fails to soften the heart of a good man.

The *origin* of the Crees, to which nation the Cumberland House Indians belong, is, like that of the other Aborigines of America, involved in obscurity. Perhaps the researches, now making into the nature and affinities of the languages spoken by the different Indian tribes, may eventually throw some light on the subject. Indeed the American philologists seem to have succeeded already in classing the known dialects into three languages:—1st. The Floridean, spoken by the Creeks, Chickesaws, Choctaws, Cherokees, Pascagoulas, and some other tribes, who inhabit the southern parts of the United States. 2d. The Iroquois, spoken by the Mengwe, or Six Nations, the Wyandots, the Nadowessies, and Asseeneepoytuck. 3d. The Lenni-lenapè, spoken by a great family more widely spread than the other two, and from which, together with a vast number of other tribes, are sprung our Crees. Mr. Heckewelder, a Missionary, who resided long amongst these people, and from whose paper, (published in the Transactions of the American Philosophical Society,) the above classification is taken, states that the Lenapè have a tradition amongst them, of their ancestors having come from the westward, and taking possession of the whole country from the Missouri to the Atlantic, after driving away or destroying the original inhabitants of the land, whom they termed Alligewi. In this migration and contest, which endured for a series of years, the Mengwe, or Iroquois, kept pace with them, moving in a parallel but more northerly line, and finally

settling on the banks of the St. Lawrence, and the great lakes from whence it flows. The Lenapè, being more numerous, peopled not only the greater part of the country at present occupied by the United States, but also sent detachments to the northward as far as the banks of the River Mississippi and the shores of Hudson's Bay. The principal of their northern tribes are now known under the names of Saulteurs or Chippeways, and Crees; the former inhabiting the country betwixt Lakes Winipeg and Superior, the latter frequenting the shores of Hudson's Bay, from Moose to Churchill, and the country from thence as far to the westward as the plains which lie betwixt the forks of the Saskatchawan.

These Crees, formerly known by the French Canadian traders under the appellation of Knisteneaux, generally designate themselves as Eithinyoowuc *(men)*, or, when they wish to discriminate themselves from the other Indian nations, as Nathehwywithinyoowuc (*Southern-men*)*.

* Much confusion has arisen from the great variety of names, applied without discrimination to the various tribes of Saulteurs and Crees. Heckewelder considers the Crees of Moose Factory to be a branch of that tribe of the Lenapè, which is named Minsi, or Wolf Tribe. He has been led to form this opinion, from the similarity of the name given to these people by Monsieur Jeremie, namely, Monsonies; but the truth is, that their real name is Mongsoa-eythinyoowuc, or Moose-deer Indians; hence the name of the factory and river on which it is built. The name Knisteneaux, Kristeneaux, or Killisteneaux, was anciently applied to a tribe of Crees, now termed Maskegons, who inhabit the river Winipeg. This small tribe still retains the peculiarities of customs and dress, for which it was remarkable many years ago, as mentioned by Mr. Henry, in the interesting account of his journeys in these countries. They are said to be great rascals. The great body of the Crees were at that time named Opimmitish Ininiwuc, or Men of the Woods. It would, however, be an endless task to attempt to determine the precise people designated by the early French writers. Every small band, naming itself from its hunting grounds, was described as a different nation. The Chippeways who frequented the Lake of the Woods were named from a particular act of pillage—Pilliers, or Robbers: and the name Saulteurs, applied to a principal band that frequented the Sault St. Marie, has been by degrees extended to the whole tribe. It is frequently pronounced and written *Sotoos*.

The original character of the Crees must have been much modified by their long intercourse with Europeans; hence it is to be understood, that we confine ourselves in the following sketch to their present condition, and more particularly to the Crees of Cumberland House. The moral character of a hunter is acted upon by the nature of the land he inhabits, the abundance or scarcity of food, and we may add, in the present case, his means of access to spirituous liquors. In a country so various in these respects as that inhabited by the Crees, the causes alluded to must operate strongly in producing a considerable difference of character amongst the various hordes. It may be proper to bear in mind also, that we are about to draw the character of a people whose only rule of conduct is public opinion, and to try them by a morality founded on divine revelation; as we are not aware that it is in the power of any one, who has been educated in a land to which the blessings of the Gospel have extended, to use any other standard.

Bearing these considerations in mind then, we may state the Crees to be a vain, fickle, improvident, and indolent race, and not very strict in their adherence to truth, being great boasters; but, on the other hand, they strictly regard the rights of property, are susceptible of the kinder affections, capable of friendship, very hospitable, tolerably kind to their women, and withal inclined to peace.

Much of the faulty part of their character, no doubt, originates in their mode of life: accustomed as a hunter to depend greatly on chance for his subsistence, the Cree takes little thought of to-morrow; and the most offensive part of his behaviour—the habit of boasting—has been probably assumed as a necessary part of his armour, which operates upon the fears of his enemies. They are countenanced, however, in this failing by the practice of the ancient Greeks, and perhaps by that of every other nation in its ruder state. Every Cree fears the medical or conjuring powers of his neighbour; but at the same time exalts his own attainments to the skies. "I am God-like"

is a common expression amongst them, and they prove their divinity-ship by eating live coals, and by various tricks of a similar nature. A medicine bag is an indispensable part of a hunter's equipment. It is generally furnished with a little bit of indigo, blue vitriol, vermilion, or some other showy article; and is, when in the hands of a noted conjuror, such an object of terror to the rest of the tribe, that its possessor is enabled to fatten at his ease upon the labours of his deluded countrymen.

A fellow of this description came to Cumberland House in the winter of 1819. Notwithstanding the then miserable state of the Indians, the rapacity of this wretch had been preying upon their necessities, and a poor hunter was actually at the moment pining away under the influence of his threats. The mighty conjuror, immediately on his arrival at the house, began to trumpet forth his powers, boasting, among other things, that although his hands and feet were tied as securely as possible, yet, when placed in a conjuring-house, he would speedily disengage himself by the aid of two or three familiar spirits, who were attendant on his call. He was instantly taken at his word, and that his exertions might not be without an aim, a *capot* or great coat was promised as the reward of his success. A conjuring-house having been erected in the usual form, that is, by sticking four willows in the ground and tying their tops to a hoop at the height of six or eight feet, he was fettered completely by winding several fathoms of rope round his body and extremities, and placed in its narrow apartment, not exceeding two feet in diameter. A moose skin being then thrown over the frame, secluded him from our view. He forthwith began to chant a kind of hymn in a very monotonous tone. The rest of the Indians, who seemed in some doubt respecting the powers of a devil when put in competition with those of a white man, ranged themselves around, and watched the result with anxiety. Nothing remarkable occurred for a long time. The conjuror continued his song at intervals, and it

was occasionally taken up by those without. In this manner an hour and a half elapsed; but at length our attention, which had begun to flag, was roused by the violent shaking of the conjuring-house. It was instantly whispered round the circle, that at least one devil had crept under the moose-skin. But it proved to be only the "God-like man" trembling with cold. He had entered the lists, stript to the skin, and the thermometer stood very low that evening. His attempts were continued, however, with considerable resolution for half an hour longer, when he reluctantly gave in. He had found no difficulty in slipping through the noose when it was formed by his countrymen; but, in the present instance, the knot was tied by Governor Williams, who is an expert sailor. After this unsuccessful exhibition his credit sunk amazingly, and he took the earliest opportunity of sneaking away from the fort.

About two years ago a conjuror paid more dearly for his temerity. In a quarrel with an Indian he threw out some obscure threats of vengeance, which passed unnoticed at the time, but were afterwards remembered. They met in the spring at Carlton House, after passing the winter in different parts of the country, during which the Indian's child died. The conjuror had the folly to boast that he had caused its death, and the enraged father shot him dead on the spot. It may be remarked, however, that both these Indians were inhabitants of the plains, and had been taught, by their intercourse with the turbulent Stone Indians, to set but comparatively little value on the life of a man.

It might be thought that the Crees have benefited by their long intercourse with civilized nations. That this is not so much the case as it ought to be, is not entirely their own fault. They are capable of being, and I believe willing to be, taught; but no pains have hitherto been taken to inform their minds, and their white acquaintances seem in general to find it easier to descend to the Indian customs, and modes of thinking, particularly with respect to women,

than to attempt to raise the Indians to theirs. Indeed, such a lamentable want of morality has been displayed by the white traders in their contests for the interests of their respective companies, that it would require a long series of good conduct to efface from the minds of the native population the ideas they have formed of the white character. Notwithstanding the frequent violations of the rights of property they have witnessed, and but too often experienced, in their own persons, these savages, as they are termed, remain strictly honest. During their visits to a post, they are suffered to enter every apartment in the house, without the least restraint, and although articles of value to them are scattered about, nothing is ever missed. They even scrupulously avoid moving any thing from its place, although they are often prompted by curiosity to examine it. In some cases, indeed, they carry this principle to a degree of self-denial which would hardly be expected. It often happens that meat, which has been paid for, (if the poisonous draught it procures them can be considered as payment,) is left at their lodges until a convenient opportunity occurs of carrying it away. They will rather pass several days without eating than touch the meat thus intrusted to their charge, even when there exists a prospect of replacing it.

The hospitality of the Crees is unbounded. They afford a certain asylum to the half-breed children when deserted by their unnatural white fathers; and the infirm, and indeed every individual in an encampment, share the provisions of a successful hunter as long as they last. Fond too as a Cree is of spirituous liquors, he is not happy unless all his neighbours partake with him. It is not easy, however, to say what share ostentation may have in the apparent munificence in the latter article; for when an Indian, by a good hunt, is enabled to treat the others with a keg of rum, he becomes the chief of a night, assumes no little stateliness of manner, and is treated with deference by those who regale at his expense. Prompted

also by the desire of gaining a *name*, they lavish away the articles they purchase at the trading posts, and are well satisfied if repaid in praise.

Gaming is not uncommon amongst the Crees of all the different districts, but it is pursued to greater lengths by those bands who frequent the plains, and who, from the ease with which they obtain food, have abundant leisure. The game most in use amongst them, termed *puckesann*, is played with the stones of a species of *prunus* which, from this circumstance, they term *puckesann-meena*. The difficulty lies in guessing the number of stones which are tossed out of a small wooden dish, and the hunters will spend whole nights at the destructive sport, staking their most valuable articles, powder and shot.

It has been remarked by some writers that the aboriginal inhabitants of America are deficient in passion for the fair sex. This is by no means the case with the Crees; on the contrary, their practice of seducing each other's wives, proves the most fertile source of their quarrels. When the guilty pair are detected, the woman generally receives a severe beating, but the husband is, for the most part, afraid to reproach the male culprit until they get drunk together at the fort; then the remembrance of the offence is revived, a struggle ensues, and the affair is terminated by the loss of a few handfuls of hair. Some husbands, however, feel more deeply the injury done to their honour, and seek revenge even in their sober moments. In such cases it is not uncommon for the offended party to walk with great gravity up to the other, and deliberately seizing his gun, or some other article of value, to break it before his face. The adulterer looks on in silence, afraid to make any attempt to save his property. In this respect, indeed, the Indian character seems to differ from the European, that an Indian, instead of letting his anger increase with that of his antagonist, assumes the utmost coolness, lest he should push him to extremities.

Although adultery is sometimes punished amongst the Crees in the

manner above described, yet it is no crime, provided the husband receives a valuable consideration for his wife's prostitution. In this case she is only lent to a friend. Neither is chastity considered as a virtue in a female before marriage, that is, before she becomes the exclusive property of one hunter.

The Cree women are not in general treated harshly by their husbands, and possess considerable influence over them. They often eat, and even get drunk, in consort with the men; a considerable portion of the labour, however, falls to the lot of the wife. She makes the hut, cooks, dresses the skins, and, for the most part, carries the heaviest load; but, when she is unable to perform her task, the husband does not consider it beneath his dignity to assist her. In illustration of this remark, I may quote the case of an Indian who visited the fort in winter. This poor man's wife had lost her feet by the frost, and he was compelled, not only to hunt, and do all the menial offices himself, but in winter to drag his wife with their stock of furniture from one encampment to another. In the performance of this duty, as he could not keep pace with the rest of the tribe in their movements, he, more than once, nearly perished of hunger.

These Indians, however, capable as they are of behaving thus kindly, affect in their discourse to despise the softer sex, and on solemn occasions, will not suffer them to eat before them or even come into their presence. In this they are countenanced by the white residents, most of whom have Indian or half-breed wives, but seem afraid of treating them with the tenderness or attention due to every female, lest they should themselves be despised by the Indians. At least, this is the only reason they assign for their neglect of those whom they make partners of their beds and mothers of their children.

Both sexes are fond of, and excessively indulgent to, their children. The father never punishes them, and if the mother, more hasty in

her temper, sometimes bestows a blow or two on a troublesome child, her heart is instantly softened by the roar which follows, and she mingles her tears with those that streak the smoky face of her darling. It may be fairly said, then, that restraint or punishment forms no part of the education of an Indian child, nor are they early trained to that command over their temper which they exhibit in after years.

The discourse of the parents is never restrained by the presence of their children, every transaction between the sexes being openly talked of before them. This is done from principle, that a child may not grow up ignorant of what they consider as necessary to be known; accordingly a boy is, from his infancy, acquainted with all the mysteries of the sex, and the mother takes care that the girls shall not fall short of their brothers in their education.

The Crees having early obtained arms from the European traders, were enabled to make harassing inroads on the lands of their neighbours, and are known to have made war excursions as far to the westward as the Rocky Mountains, and to the northward as far as M'Kenzie's River; but their enemies being now as well armed as themselves, the case is much altered.

They shew great fortitude in the endurance of hunger, and the other evils incident to a hunter's life; but any unusual accident dispirits them at once, and they seldom venture to meet their enemies in open warfare, or to attack them even by surprise, unless with the advantage of superiority of numbers. Perhaps they are much deteriorated in this respect by their intercourse with Europeans. Their existence at present hangs upon the supplies of ammunition and clothing they receive from the traders, and they deeply feel their dependant situation. But their character has been still more debased by the passion for spirituous liquors, so assiduously fostered among them. To obtain the noxious beverage, they descend to the most humiliating entreaties, and assume an abjectness of behaviour which

does not seem natural to them, and of which not a vestige is to be seen in their intercourse with each other. Their character has sunk among the neighbouring nations. They are no longer the warriors who drove before them the inhabitants of the Saskatchawan and Missinippi. The Cumberland House Crees in particular, have been long disused to war. Betwixt them and their ancient enemies, the Slave nations, lie the extensive plains of the Saskatchawan, inhabited by the powerful Asseeneepoytuck, or Stone Indians, who having, whilst yet a small tribe, entered the country under the patronage of the Crees, now render back the protection they received. The manners and customs of the Crees have, probably, since their acquaintance with Europeans, undergone a change, at least, equal to that which has taken place in their moral character; and, although we heard of many practices peculiar to them, yet they appeared to be nearly as much honoured in the breach as the observance. We shall, however, briefly notice a few of the most remarkable customs.

When a hunter marries his first wife, he usually takes up his abode in the tent of his father-in-law, and of course hunts for the family; but when he becomes a father, the families are at liberty to separate, or remain together, as their inclinations prompt them. His second wife is for the most part the sister of the first, but not necessarily so, for an Indian of another family often presses his daughter upon a hunter whom he knows to be capable of maintaining her well. The first wife always remains the mistress of the tent, and assumes an authority over the others, which is not in every case quietly submitted to. It may be remarked, that whilst an Indian resides with his wife's family, it is extremely improper for his mother-in-law to speak, or even look at him; and when she has a communication to make, it is the etiquette that she should turn her back upon him, and address him only through the medium of a third person. This singular custom is not very creditable to the Indians, if it really

had its origin in the cause which they at present assign for it, namely, that a woman's speaking to her son-in-law is a sure indication of her having conceived a criminal affection for him.

It appears also to have been an ancient practice for an Indian to avoid eating or sitting down in the presence of the father-in-law. We received no account of the origin of this custom, and it is now almost obsolete amongst the Cumberland House Crees, though still partially observed by those who frequent Carlton.

Tattooing is almost universal with the Crees. The women are in general content with having one or two lines drawn from the corners of the mouth towards the angles of the lower jaw; but some of the men have their bodies covered with a great variety of lines and figures. It seems to be considered by most rather as a proof of courage than an ornament, the operation being very painful, and, if the figures are numerous and intricate, lasting several days. The lines on the face are formed by dexterously running an awl under the cuticle, and then drawing a cord, dipt in charcoal and water, through the canal thus formed. The punctures on the body are formed by needles of various sizes set in a frame. A number of hawk bells attached to this frame serve by their noise to cover the suppressed groans of the sufferer, and, probably for the same reason, the process is accompanied with singing. An indelible stain is produced by rubbing a little finely-powdered willow-charcoal into the punctures. A half-breed, whose arm I amputated, declared, that tattooing was not only the most painful operation of the two, but rendered infinitely more difficult to bear by its tediousness, having lasted in his case three days.

A Cree woman, when visited by the periodical disorder incident to the sex, is laid under considerable restraint. They are far, however, from carrying matters to the extremities mentioned by Hearne in his description of the Chepewyans, or Northern Indians. She lives apart from her husband also for two months if she has borne a

boy, and for three if she has given birth to a girl. Some mothers preserve a piece of the navel-string, sew it up in a bag neatly ornamented, and suspend it as an amulet to the outer garment of the child.

Many of the Cree hunters are careful to prevent a woman from partaking of the head of a moose-deer, lest it should spoil their future hunts; and for the same reason they avoid bringing it to a fort, fearing lest the white people should give the bones to the dogs.

The games or sports of the Crees are various. One, termed the game of the Mitten, is played with four balls, three of which are plain, and one marked. These being hid under as many mittens, the opposite party is required to fix on that which is marked. He gives or receives a feather according as he guesses right or wrong. When the feathers, which are ten in number, have all passed into one hand, a new division is made; but when one of the parties obtains possession of them thrice, he seizes on the stakes.

The game of Platter is more intricate, and is played with the claws of a bear, or some other animal, marked with various lines and characters. These dice, which are eight in number, and cut flat at their large end, are shook together in a wooden dish, tossed into the air and caught again. The lines, traced on such claws as happen to alight on the platter in an erect position, indicate what number of counters the caster is to receive from his opponent.

They have, however, a much more manly amusement termed the *Cross*, although they do not engage even in it without depositing considerable stakes. An extensive meadow is chosen for this sport, and the articles staked are tied to a post, or deposited in the custody of two old men. The combatants being stript and painted, and each provided with a kind of battledore or racket, in shape resembling the letter P, with a handle about two feet long, and a head loosely wrought with net-work, so as to form a shallow bag, range themselves on different sides. A ball being now tossed up in the middle,

each party endeavours to drive it to their respective goals, and much dexterity and agility is displayed in the contest. When a nimble runner gets the ball in his *cross*, he sets off towards the goal with the utmost speed, and is followed by the rest, who endeavour to jostle him and shake it out; but, if hard pressed, he discharges it with a jerk, to be forwarded by his own party, or bandied back by their opponents, until the victory is decided by its passing the goal.

Of the religious opinions of the Crees, it is difficult to give a correct account, not only because they shew a disinclination to enter upon the subject, but because their ancient traditions are mingled with the information they have more recently obtained, by their intercourse with Europeans.

None of them ventured to describe the original formation of the world, but they all spoke of an universal deluge, caused by an attempt of the fish to drown Wæsack-ootchacht, a kind of demi-god, with whom they had quarrelled. Having constructed a raft, he embarked with his family, and all kinds of birds and beasts. After the flood had continued for some time, he ordered several water-fowl to dive to the bottom; they were all drowned: but a musk-rat having been despatched on the same errand, was more successful, and returned with a mouthful of mud, out of which Wæsack-ootchacht, imitating the mode in which the rats construct their houses, formed a new earth. First, a small conical hill of mud appeared above the water; by-and-by, its base gradually spreading out, it became an extensive bank, which the rays of the sun at length hardened into firm land. Notwithstanding the power that Wæsack-ootchacht here displayed, his person is held in very little reverence by the Indians; and, in return, he seizes every opportunity of tormenting them. His conduct is far from being moral, and his amours, and the disguises he assumes in the prosecution of them, are more various and extraordinary than those of the Grecian Jupiter himself: but as his adventures are more remarkable for their eccentricity than their

delicacy, it is better to pass them over in silence. Before we quit him, however, we may remark, that he converses with all kinds of birds and beasts in their own languages, constantly addressing them by the title of brother, but through an inherent suspicion of his intentions, they are seldom willing to admit of his claims of relationship. The Indians make no sacrifices to him, not even to avert his wrath. They pay a kind of worship, however, and make offerings to a being, whom they term *Kepoochikawn.*

This deity is represented sometimes by rude images of the human figure, but more commonly merely by tying the tops of a few willow bushes together; and the offerings to him consist of every thing that is valuable to an Indian; yet they treat him with considerable familiarity, interlarding their most solemn speeches with expostulations and threats of neglect, if he fails in complying with their requests. As most of their petitions are for plenty of food, they do not trust entirely to the favour of Kepoochikawn, but endeavour, at the same time, to propitiate the *animal,* an imaginary representative of the whole race of larger quadrupeds that are objects of the chase.

In the month of May, whilst I was at Carlton House, the Cree hunter, engaged to attend that post, resolved upon dedicating several articles to Kepoochikawn, and as I had made some inquiries of him respecting their modes of worship, he gave me an invitation to be present. The ceremony took place in a sweating-house, or as it may be designated from its more important use, a *temple,* which was erected for the occasion by the worshipper's two wives. It was framed of arched willows, interlaced so as to form a vault capable of containing ten or twelve men, ranged closely side by side, and high enough to admit of their sitting erect. It was very similar in shape to an oven, or the kraal of a Hottentot, and was closely covered with moose skins, except at the east end, which was left open for a door. Near the centre of the building there was a hole

in the ground, which contained ten or twelve red-hot stones, having a few leaves of the *taccohaymenan*, a species of *prunus*, strewed around them. When the women had completed the preparations, the hunter made his appearance, perfectly naked, carrying in his hand an image of Kepoochikawn, rudely carved, and about two feet long. He placed his god at the upper end of the sweating-house, with his face towards the door, and proceeded to tie round its neck his offerings, consisting of a cotton handkerchief, a looking-glass, a tin pan, a piece of riband, and a bit of tobacco, which he had procured the same day, at the expense of fifteen or twenty skins. Whilst he was thus occupied, several other Crees, who were encamped in the neighbourhood, having been informed of what was going on, arrived, and stripping at the door of the temple, entered, and ranged themselves on each side; the hunter himself squatted down at the right hand of Kepoochikawn. The atmosphere of the temple having become so hot that none but zealous worshippers would venture in, the interpreter and myself sat down on the threshold, and the two women remained on the outside as attendants.

The hunter, who throughout officiated as high priest, commenced by making a speech to Kepoochikawn, in which he requested him to be propitious, told him of the value of the things now presented, and cautioned him against ingratitude. This oration was delivered in a monotonous tone, and with great rapidity of utterance, and the speaker retained his squatting posture, but turned his face to his god. At its conclusion the priest began a hymn, of which the burthen was, "I will walk with God, I will go with the animal;" and, at the end of each stanza, the rest joined in an insignificant chorus. He next took up a calumet, filled with a mixture of tobacco, and bear-berry leaves, and holding its stem by the middle, in a horizontal position, over the hot stones, turned it slowly in a circular manner, following the course of the sun. Its mouth-piece

being then, with much formality, held for a few seconds to the face of Kepoochikawn, it was next presented to the earth, having been previously turned a second time over the hot stones; and afterwards, with equal ceremony, pointed in succession to the four quarters of the sky; then drawing a few whiffs from the calumet himself, he handed it to his left-hand neighbour, by whom it was gravely passed round the circle; the interpreter and myself, who were seated at the door, were asked to partake in our turn, but requested to keep the head of the calumet within the threshold of the sweating-house. When the tobacco was exhausted by passing several times round, the hunter made another speech, similar to the former; but was, if possible, still more urgent in his requests. A second hymn followed, and a quantity of water being sprinkled on the hot stones, the attendants were ordered to close the temple, which they did, by very carefully covering it up with moose skins. We had no means of ascertaining the temperature of the sweating-house; but before it was closed, not only those within, but also the spectators without, were perspiring freely. They continued in the vapour bath for thirty-five minutes, during which time a third speech was made, and a hymn was sung, and water occasionally sprinkled on the stones, which still retained much heat, as was evident from the hissing noise they made. The coverings were then thrown off, and the poor half-stewed worshippers exposed freely to the air; but they kept their squatting postures until a fourth speech was made, in which the deity was strongly reminded of the value of the gifts, and exhorted to take an early opportunity of shewing his gratitude. The ceremony concluded by the sweaters scampering down to the river, and plunging into the stream. It may be remarked, that the door of the temple, and, of course, the face of the god, was turned to the rising sun; and the spectators were desired not to block up entirely the front of the building, but to leave a lane for the entrance or exit of some influence of which they could not give me a

correct description. Several Indians, who lay on the outside of the sweating-house as spectators, seemed to regard the proceedings with very little awe, and were extremely free in the remarks and jokes they passed upon the condition of the sweaters, and even of Kepoochikawn himself. One of them made a remark, that the shawl would have been much better bestowed upon himself than upon Kepoochikawn, but the same fellow afterwards stripped and joined in the ceremony.

I did not learn that the Indians worship any other god by a specific name. They often refer, however, to the Keetchee-Maneeto, or Great Master of Life; and to an evil spirit, or Maatche-Maneeto. They also speak of Weettako, a kind of vampyre or devil, into which those who have fed on human flesh are transformed.

Whilst at Carlton, I took an opportunity of asking a communicative old Indian, of the Blackfoot nation, his opinion of a future state; he replied, that they had heard from their fathers, that the souls of the departed have to scramble with great labour up the sides of a steep mountain, upon attaining the summit of which they are rewarded with the prospect of an extensive plain, interspersed here and there with new tents, pitched in agreeable situations, and abounding in all sorts of game. Whilst they are absorbed in the contemplation of this delightful scene, they are descried by the inhabitants of the happy land, who, clothed in new skins, approach and welcome with every demonstration of kindness those Indians who have led good lives; but the bad Indians, who have imbrued their hands in the blood of their countrymen, are told to return from whence they came, and without more ceremony precipitated down the steep sides of the mountain.

Women, who have been guilty of infanticide, never reach the mountain at all, but are compelled to hover round the seats of their crimes, with branches of trees tied to their legs. The melancholy sounds, which are heard in the still summer evenings, and which

the ignorance of the white people considers as the screams of the goat-sucker, are really, according to my informant, the moanings of these unhappy beings.

The Crees have somewhat similar notions, but as they inhabit a country widely different from the mountainous lands of the Black-foot Indians, the difficulty of their journey lies in walking along a slender and slippery tree, laid as a bridge across a rapid stream of stinking and muddy water. The night owl is regarded by the Crees with the same dread that it has been viewed by other nations. One small species, which is known to them by its melancholy nocturnal hootings, (for as it never appears in the day, few even of the hunters have ever seen it) is particularly ominous. They call it the *cheepai-peethees*, or death bird, and never fail to whistle when they hear its note. If it does not reply to the whistle by its hootings, the speedy death of the inquirer is augured.

When a Cree dies, that part of his property, which he has not given away before his death, is burned with him, and his relations take care to place near the grave little heaps of fire-wood, food, pieces of tobacco, and such things as he is likely to need in his journey. Similar offerings are made when they revisit the grave, and as kettles, and other articles of value, are sometimes offered, they are frequently carried off by passengers, yet the relations are not displeased, provided sufficient respect has been shewn to the dead, by putting some other article, although of inferior value, in the place of that which has been taken away.

The Crees are wont to celebrate the returns of the seasons by religious festivals, but we are unable to describe the ceremonial in use on these joyous occasions from personal observation. The following brief notice of a feast, which was given by an old Cree chief, according to his annual custom, on the first croaking of the frogs, is drawn up from the information of one of the guests. A large oblong tent, or lodge, was prepared for the important occasion, by

the men of the party, none of the women being suffered to interfere. It faced the setting sun, and great care was taken that every thing about it should be as neat and clean as possible. Three fire-places were raised within it, at equal distances, and little holes were dug in the corners to contain the ashes of their pipes. In a recess, at its upper end, one large image of Kepoochikawn, and many smaller ones, were ranged with their faces towards the door. The food was prepared by the chief's wife, and consisted of *marrow*-pemmican, berries boiled with fat, and various other delicacies that had been preserved for the occasion.

The preparations being completed, and a slave, whom the chief had taken in war, having warned the guests to the feast by the mysterious word *peenasheway*, they came, dressed out in their best garments, and ranged themselves according to their seniority, the elders seating themselves next the chief at the upper end, and the young men near the door.

The chief commenced by addressing his deities in an appropriate speech, in which he told them, that he had hastened as soon as summer was indicated by the croaking of the frogs, to solicit their favour for himself and his young men, and hoped that they would send him a pleasant and plentiful season. His oration was concluded by an invocation to all the animals in the land, and a signal being given to the slave at the door, he invited them severally by their names to come and partake of the feast.

The Cree chief having by this very general invitation displayed his unbounded hospitality, next ordered one of the young men to distribute a mess to each of the guests. This was done in new dishes of birch bark, and the utmost diligence was displayed in emptying them, it being considered extremely improper in a man to leave any part of that which is placed before him on such occasions. It is not inconsistent with good manners however, but rather considered as a piece of politeness, that a guest who has been too liberally sup-

plied, should hand the surplus to his neighbour. When the viands had disappeared, each filled his calumet and began to smoke with great assiduity, and in the course of the evening several songs were sung to the responsive sounds of the drum and seeseequay, their usual accompaniments.

The Cree drum is double-headed, but possessing very little depth, it strongly resembles a tambourine in shape. Its want of depth is compensated, however, by its diameter, which frequently exceeds three feet. It is covered with moose skin parchment, painted with rude figures of men and beasts, having various fantastic additions, and is beat with a stick. The seeseequay is merely a rattle, formed by enclosing a few grains of shot in a piece of dried hide. These two instruments are used in all their religious ceremonies, except those which take place in a sweating-house.

A Cree places great reliance on his drum, and I cannot adduce a stronger instance than that of the poor man who is mentioned in a preceding page, as having lost his only child by famine, almost within sight of the fort. Notwithstanding his exhausted state, he travelled with an enormous drum tied to his back.

Many of the Crees make vows to abstain from particular kinds of food, either for a specific time, or for the remainder of their life, esteeming such abstinence to be a certain means of acquiring some supernatural powers, or at least of entailing upon themselves a succession of good fortune.

One of the wives of the Carlton hunter, of whom we have already spoken as the worshipper of Kepoochikawn, made a determination not to eat of the flesh of the Wawaskeesh, or American stag; but during our abode at that place, she was induced to feed heartily upon it, through the intentional deceit of her husband, who told her that it was buffaló meat. When she had finished her meal, her husband told her of the trick, and seemed to enjoy the terror with which she contemplated the consequences of the involuntary breach of her

vow. Vows of this nature are often made by a Cree before he joins a war party, and they sometimes, like the eastern bonzes, walk for a certain number of days on all fours, or impose upon themselves some other penance, equally ridiculous. By such means the Cree warrior becomes *godlike;* but unless he kills an enemy before his return, his newly-acquired powers are esteemed to be productive in future of some direful consequence to himself.

As we did not witness any of the Cree dances ourselves, we shall merely mention, that like the other North American nations, they are accustomed to practise that amusement on meeting with strange tribes, before going to war, and on other solemn occasions.

The habitual intoxication of the Cumberland House Crees has induced such a disregard of personal appearance, that they are squalid and dirty in the extreme; hence a minute description of their clothing would be by no means interesting. We shall, therefore, only remark in a general manner, that the dress of the males consists of a blanket thrown over the shoulders, a leathern shirt or jacket, and a piece of cloth tied round the middle. The women have in addition a long petticoat; and both sexes wear a kind of wide hose, which reaching from the ancle to the middle of the thigh, are suspended by strings to the girdle. These hose, or as they are termed, *Indian stockings*, are commonly ornamented with beads or ribands, and from their convenience, have been universally adopted by the white residents, as an essential part of their winter clothing. Their shoes, or rather short boots, for they tie round the ancle, are made of soft dressed moose skins, and during the winter they wrap several pieces of blanket round their feet.

They are fond of European articles of dress, considering it as mean to be dressed entirely in leather, and the hunters are generally furnished annually with a *capot* or great coat, and the women with shawls, printed calicoes, and other things very unsuitable to their mode of life, but which they wear in imitation of the wives of the

traders; all these articles, however showy they may be at first, are soon reduced to a very filthy condition by the Indian custom of greasing the face and hair with soft fat or marrow, instead of washing them with water. This practice they say preserves the skin soft, and protects it from cold in the winter, and the moschetoes in summer, but it renders their presence disagreeable to the olfactory organs of an European, particularly when they are seated in a close tent and near a hot fire.

The only peculiarity which we observed, in their mode of rearing children consists in the use of a sort of cradle, extremely well adapted to their mode of life. The infant is placed in the bag having its lower extremities wrapt up in soft sphagnum or bog-moss, and may be hung up in the tent, or to the branch of a tree, without the least danger of tumbling out; or in a journey suspended on the mother's back, by a band which crosses the forehead, so as to leave her hands perfectly free. It is one of the neatest articles of furniture they possess, being generally ornamented with beads, and bits of scarlet cloth, but it bears a very strong resemblance in its form to a mummy case.

The sphagnum in which the child is laid, forms a soft elastic bed, which absorbs moisture very readily, and affords such a protection from the cold of a rigorous winter, that its place would be ill supplied by cloth.

The mothers are careful to collect a sufficient quantity in autumn for winter use; but when through accident their stock fails, they have recourse to the soft down of the typha, or reed mace, the dust of rotten wood, or even feathers, although none of these articles are so cleanly, or so easily changed, as the sphagnum.

The above is a brief sketch of such parts of the manners, character, and customs of the Crees, as we could collect from personal observation, or from the information of the most intelligent half-breeds we met with; and we shall merely add a few remarks on

the manner in which the trade is conducted at the different inland posts of the fur Companies.

The standard of exchange in all mercantile transactions with the natives is a beaver skin, the relative value of which, as originally established by the traders, differs considerably from the present worth of the articles it represents; but the Indians are averse to change. Three martin, eight musk-rat, or a single lynx, or wolverene skin, are equivalent to one beaver; a silver fox, white fox, or otter, are reckoned two beavers, and a black fox, or large black bear, are equal to four; a mode of reckoning which has very little connexion with the real value of these different furs in the European market. Neither has any attention been paid to the original cost of European articles, in fixing the tarif by which they are sold to the Indians. A coarse butcher's knife is one skin, a woollen blanket or a fathom of coarse cloth, eight, and a fowling-piece fifteen. The Indians receive their principal outfit of clothing and ammunition on credit in the autumn, to be repaid by their winter hunts; the amount intrusted to each of the hunters, varying with their reputations for industry and skill, from twenty to one hundred and fifty skins. The Indians are generally anxious to pay off the debt thus incurred, but their good intentions are often frustrated by the arts of the rival traders. Each of the Companies keeps men constantly employed travelling over the country during the winter, to collect the furs from the different bands of hunters as fast as they are procured. The poor Indian endeavours to behave honestly, and when he has gathered a few skins sends notice to the post from whence he procured his supplies, but if discovered in the mean time by the opposite party, he is seldom proof against the temptation to which he is exposed. However firm he may be in his denials at first, his resolutions are enfeebled by the sight of a little rum, and when he has tasted the intoxicating beverage, they vanish like smoke, and he brings forth his store of furs, which he has carefully concealed

from the scrutinizing eyes of his visitors. This mode of carrying on the trade not only causes the amount of furs, collected by either of the two Companies, to depend more upon the activity of their agents, the knowledge they possess of the motions of the Indians, and the quantity of rum they carry, than upon the liberality of the credits they give, but is also productive of an increasing deterioration of the character of the Indians, and will, probably, ultimately prove destructive to the fur trade itself. Indeed the evil has already, in part, recoiled upon the traders; for the Indians, long deceived, have become deceivers in their turn, and not unfrequently after having incurred a heavy debt at one post, move off to another, to play the same game. In some cases the rival posts have entered into a mutual agreement, to trade only with the Indians they have respectively fitted out; but such treaties, being seldom rigidly adhered to, prove a fertile subject for disputes, and the differences have been more than once decided by force of arms. To carry on the contest, the two Companies are obliged to employ a great many servants, whom they maintain often with much difficulty, and always at a considerable expense.

There are thirty men belonging to the Hudson's Bay Fort at Cumberland, and nearly as many women and children.

The inhabitants of the North West Company's house are still more numerous. These large families are fed during the greatest part of the year on fish, which are principally procured at Beaver Lake, about fifty miles distant. The fishery commencing with the first frosts in autumn, continues abundant till January, and the produce is dragged over the snow on sledges, each drawn by three dogs, and carrying about two hundred and fifty pounds. The journey to and from the lake occupies five days, and every sledge requires a driver. About three thousand fish, averaging three pounds a piece, were caught by the Hudson's Bay fishermen last season; in addition to which a few sturgeon were occasionally caught in Pine

Island Lake; and towards the spring a considerable quantity of moose meat was procured from the Basquian Hill, sixty or seventy miles distant. The rest of our winter's provision consisted of geese, salted in the autumn, and of dried meats and pemmican, obtained from the provision posts on the plains of the Saskatchawan. A good many potatoes are also raised at this post, and a small supply of tea and sugar is brought from the depôt at York Factory. The provisions obtained from these various sources were amply sufficient in the winter of 1819-20; but through improvidence this post has in former seasons been reduced to great straits.

Many of the labourers, and a great majority of the agents and clerks employed by the two Companies, have Indian or half-breed wives, and the mixed offspring thus produced has become extremely numerous.

These métifs, or as the Canadians term them, *bois-brulés*, are upon the whole a good looking people, and where the experiment has been made, have shewn much aptness in learning, and willingness to be taught; they have, however, been sadly neglected. The example of their fathers has released them from the restraint imposed by the Indian opinions of good and bad behaviour; and, generally speaking, no pains have been taken to fill the void with better principles. Hence it is not surprising that the males, trained up in a high opinion of the authority and rights of the Company to which their fathers belonged, and unacquainted with the laws of the civilized world, should be ready to engage in any measure whatever, that they are prompted to believe will forward the interests of the cause they espouse. Nor that the girls, taught a certain degree of refinement by the acquisition of an European language, should be inflamed by the unrestrained discourse of their Indian relations, and very early give up all pretensions to chastity. It is, however, but justice to remark, that there is a very decided difference in the conduct of the children of the Orkney men employed

by the Hudson's Bay Company and those of the Canadian voyagers. Some trouble is occasionally bestowed in teaching the former, and it is not thrown away; but all the good that can be said of the latter is, that they are not quite so licentious as their fathers are.

Many of the half-breeds, both male and female, are brought up amongst, and intermarry with, the Indians; and there are few tents wherein the paler children of such marriages are not to be seen. It has been remarked, I do not know with what truth, that half-breeds shew more personal courage than the pure Crees.

A singular change takes place in the physical constitution of the Indian females who become inmates of a fort; namely, they bear children more frequently and longer, but, at the same time, are rendered liable to indurations of the mammæ and prolapsus of the uterus; evils from which they are, in a great measure, exempt whilst they lead a wandering and laborious life.

The girls at the forts, particularly the daughters of Canadians, are given in marriage very young; they are very frequently wives at twelve years of age, and mothers at fourteen. Nay, more than one instance came under our observation, of the master of a post having permitted a voyager to take to wife a poor child that had scarcely attained the age of ten years. The masters and wintering partners of the Companies deemed this criminal indulgence to the vices of their servants, necessary to stimulate them to exertion for the interest of their respective concerns. Another practice may also be noticed, as shewing the state of moral feeling on these subjects amongst the white residents of the fur countries. It was not very uncommon, amongst the Canadian voyagers, for one woman to be common to, and maintained at the joint expense of, two men; nor for a voyager to sell his wife, either for a season, or altogether, for a sum of money, proportioned to her beauty and good qualities, but always inferior to the price of a team of dogs.

The country around Cumberland House is flat and swampy, and

is much intersected by small lakes. A very new magnesian limestone is found every where under a thin stratum of soil, and it not unfrequently shows itself above the surface. It lies in strata generally horizontal, but in one spot near the fort, dipping to the northward at an angle of 40°. Some portions of this rock contain very perfect shells. With respect to the vegetable productions of the district, the *populus trepida*, or aspen, which thrives in moist situations, is, perhaps, the most abundant tree on the banks of the Saskatchawan, and is much prized as fire-wood, burning well when cut green. The *populus balsamifera*, called by the Crees *matheh metoos*, or ugly poplar, in allusion to its rough bark and naked stem, crowned, in an aged state, with a few distorted branches, is scarcely less plentiful. It is an inferior fire-wood, and does not burn well, unless when cut in the spring, and dried during the summer; but it affords a great quantity of potash. A decoction of its resinous buds has been sometimes used by the Indians with success in cases of *snow-blindness*, but its application to the inflamed eye produces much pain. Of pines, the white spruce is the most common here; the red and black spruce, the balsam of Gilead fir, and Jersey pine, also occur frequently. The larch is found only in swampy spots, and is stunted and unhealthy. The canoe birch attains a considerable size in this latitude, but from the great demand for its wood to make sledges, it has become rare. The alder abounds on the margin of the little grassy lakes, so common in the neighbourhood. A decoction of its inner bark is used as an emetic by the Indians, who also extract from it a yellow dye. A great variety of willows occur on the banks of the streams; and the hazel is met with sparingly in the woods. The sugar maple, elm, ash, and the *arbor vitæ*, termed by the Canadian voyagers *cedar*, grow on various parts of the Saskatchawan; but that river seems to form their northern boundary. Two kinds of prunus also grow here, one of which, a handsome small tree, produces a black fruit, having a very astringent taste, whence the

term *choke-cherry* applied to it. The Crees call it *tawquoy-meena*, and esteem it to be, when dried and bruised, a good addition to pemmican. The other species is a less elegant shrub, but is said to bear a bright red cherry, of a pleasant sweet taste. Its Cree name is *passee-awey-meenan*, and it is known to occur as far north as Great Slave Lake.

The most esteemed fruit of the country, however, is the produce of the *aronia ovalis*. Under the name of *meesasscootoomeena* it is a favourite dish at most of the Indian feasts, and mixed with pemmican, it renders that greasy food actually palatable. A great variety of currants and gooseberries are also mentioned by the natives, under the name of *sappoom-meena*, but we only found three species in the neighbourhood of Cumberland House. The strawberry, called by the Crees *otei-meena*, or heart-berry, is found in abundance, and rasps are common on the sandy banks of the rivers. The fruits hitherto mentioned fall in the autumn, but the following berries remained hanging on the bushes in the spring, and are considered as much mellowed by exposure to the colds of winter. The red whortleberry *(arbutus vitis idea)* is found every where, but is most abundant in rocky places. It is aptly termed by the Crees *weesawgum-meena*, sour-berry. The common cranberry *(oxycoccos palustris,)* is distinguished from the preceding by its growing on moist sphagnous spots, and is hence called *maskægo-meena*, swamp-berry. The American guelder rose, whose fruits so strongly resembles the cranberry, is also common. There are two kinds of it, *(viburnum oxycoccos*, and *edule*,) one termed by the natives *peepoon-meena*, winter-berry, and the other *mongsoa-meena*, moose-berry. There is also a berry of a bluish white colour, the produce of the white cornel tree, which is named *musqua-meena*, bear-berry, because these animals are said to fatten on it. The dwarf Canadian cornel, bears a corymb of red berries, which are highly ornamental to the woods throughout the country, but are not otherwise worthy

of notice, for they have an insipid farinaceous taste, and are seldom gathered. The Crees extract some beautiful colours from several of their native vegetables. They dye their porcupine quills a beautiful scarlet, with the roots of two species of bed-straw, (galium tinctorium, and boreale) which they indiscriminately term *sawoyan.* The roots, after being carefully washed, are boiled gently in a clean copper kettle, and a quantity of the juice of the moose berry, strawberry, cranberry, or arctic raspberry, is added together with a few red tufts of pistils of the larch. The porcupine quills are plunged into the liquor before it becomes quite cold, and are soon tinged of a beautiful scarlet. The process sometimes fails, and produces only a dirty brown, a circumstance which ought probably to be ascribed to the use of an undue quantity of acid. They dye black with an ink made of elder bark, and a little bog-iron-ore, dried and pounded, and they have various modes of producing yellow. The deepest colour is obtained from the dried root of a plant, which from their description appears to be the cow-bane *(cicuta virosa.)* An inferior colour is obtained from the bruised buds of the Dutch myrtle, and they have discovered methods of dyeing with various lichens.

The quadrupeds that are hunted for food in this part of the country, are the moose and the rein-deer, the former termed by the Crees, *mongsoa* or *moosoa,* the latter *attekh.* The buffalo or bison, *(moostoosh,)* the red-deer or American-stag, *(wawaskeeshoo,)* and the *apistatchækoos,* a species of antelope, animals that frequent the plains above the forks of the Saskatchawan, are not found in the neighbourhood of Cumberland House.

Of fur-bearing animals, various kinds of foxes *(makkeeshewuc,)* are found in the district, distinguished by the traders under the names of *black, silver, cross, red,* and *blue* foxes. The two former are considered by the Indians to be the same kind, varying accidentally in the colour of the pelt. The black foxes are very rare, and fetch a high price. The cross and red foxes differ from each

other only in colour, being of the same shape and size. Their shades of colour are not disposed in any determinate manner, some individuals approaching in that respect very nearly to the silver fox, others exhibiting every link of the chain down to a nearly uniform deep or orange-yellow, the distinguishing colour of a pure red fox. It is reported both by Indians and traders, that all the varieties have been found in the same litter. The blue fox is seldom seen here, and is supposed to come from the southward. The gray wolf *(mahaygan,)* is common here. In the month of March the females frequently entice the domestic dog from the forts, although at other seasons a strong antipathy seemed to subsist between them. Some black wolves are occasionally seen. The black and red varieties of the American bear *(musquah)* are also found near Cumberland House, though not frequently; a black bear often has red cubs, and *vice versâ*. The grizzly bear, so much dreaded by the Indians for its strength and ferocity, inhabits a tract of country nearer the Rocky Mountains. It is extraordinary that although I made inquiries extensively amongst the Indians, I met with but one who said that he had killed a she-bear with young in the womb.

The wolverene, in cree *okeekoohawgees*, or *ommeethatsees*, is an animal of great strength and cunning, and is much hated by the hunters, on account of the mischief it does to their marten-traps. The Canadian lynx *(peeshew)* is a timid but well-armed animal, which preys upon the American hare. Its fur is esteemed. The marten *(wapeestan,)* is one of the most common furred animals in the country. The fisher, notwithstanding its name, is an inhabitant of the land, living like the common marten principally on mice. It is the *otchæk* of the Crees, and the *pekan* of the Canadians. The mink, *(atjackash,)* has been often confounded by writers with the fisher. It is a much smaller animal, inhabits the banks of rivers, and swims well; its prey is fish. The otter, *(neekeek,)* is larger than the English species, and produces a much more valuable fur.

The musk rat (*watsuss*, or *musquash*,) is very abundant in all the small grassy lakes. They build small conical houses with a mixture of hay and earth; those which build early raising their houses on the mud of the marshes, and those which build later in the season founding their habitations upon the surface of the ice itself. The house covers a hole in the ice, which permits them to go into the water in search of the roots on which they feed. In severe winters when the small lakes are frozen to the bottom, and these animals cannot procure their usual food, they prey upon each other. In this way great numbers are destroyed.

The beaver (*ammisk*) furnishes the staple fur of the country. Many surprising stories have been told of the sagacity with which this animal suits the form of its habitation, retreats, and dam, to local circumstances; and I compared the account of its manners. given by Cuvier, in his *Règne Animal*, with the reports of the Indians, and found them to agree exactly. They have been often seen in the act of constructing their houses in the moon-light nights, and the observers agree, that the stones, wood, or other materials, are carried in their teeth, and generally leaning against the shoulder. When they have placed it to their mind, they turn round and give it a smart blow with their flat tail. In the act of diving they give a similar stroke to the surface of the water. They keep their provision of wood under water in front of the house. Their favourite food is the bark of the aspen, birch, and willow; they also eat the alder, but seldom touch any of the pine tribe unless from necessity; they are fond of the large roots of the *nuphar luteum*, and grow fat upon it, but it gives their flesh a strong rancid taste. In the season of love their call resembles a groan, that of the male being the hoarsest, but the voice of the young is exactly like the cry of a child. They are very playful, as the following anecdote will shew:— One day a gentleman, long resident in this country, espied five young beavers sporting in the water, leaping upon the trunk of a

tree, pushing one another off, and playing a thousand interesting tricks. He approached softly, under cover of the bushes, and prepared to fire on the unsuspecting creatures, but a nearer approach discovered to him such a similitude betwixt their gestures and the infantile caresses of his own children, that he threw aside his gun. This gentleman's feelings are to be envied, but few traders in fur would have acted so feelingly. The musk rat frequently inhabits the same lodge with the beaver, and the otter also thrusts himself in occasionally: the latter, however, is not always a civil guest, as he sometimes devours his host.

These are the animals most interesting in an economical point of view. The American hare, and several kinds of grouse and ptarmigan, also contribute towards the support of the natives; and the geese, in their periodical flights in the spring and autumn, likewise prove a valuable resource both to the Indians and white residents; but the principal article of food, after the moose-deer, is fish; indeed, it forms almost the sole support of the traders at some of the posts. The most esteemed fish is a species of salmo, the *attihhawmeg* of the Crees, and the *white-fish* of the Americans. Its usual weight is between three and four pounds, but it has been known to reach sixteen or eighteen pounds. Three fish of the ordinary size is the daily allowance to each man at the fort, and is considered as equivalent to two geese, or eight pounds of solid moose-meat. The fishery for the attihhawmeg lasts the whole year, but is most productive in the spawning season, from the middle of September to the middle of October. The *ottonneebees*, another species of salmo, closely resembles the last. Three species of carp are also found abundantly in all the lakes, their Cree names are *namaypeeth*, *meethquawmaypeeth*, and *wapawhawkeeshew*. The *occow*, or river perch, termed also horn-fish, piccarel, or dorè, is common, but is not so much esteemed as the attihhawmeg. It attains the length of twenty inches in these lakes. The methy is another common

fish; it is the *gadus lota*, or burbot, of Europe. Its length is about two feet, its gullet is capacious, and it preys upon fish large enough to distend its body to nearly twice its proper size. It is never eaten, not even by the dogs unless through necessity, but its liver and roe are considered as delicacies.

The pike is also plentiful, and being readily caught in the winter time with the hook, is so much prized on that account by the natives, as to receive from them the name of *eithinyoo-cannooshæoo*, or Indian fish. The common trout, or *nammæcous*, grows here to an enormous size, being caught in particular lakes, weighing upwards of sixty pounds; thirty pounds is no uncommon size at Beaver Lake, from whence Cumberland House is supplied. The *oweepeetcheesees*, or gold-eye, is a beautiful small fish, of the genus *esox*, and resembling the gar-fish.

One of the largest fish is the *mathemegh*, cat-fish, or *barbue*. It belongs to the genus *silurus*. It is rare, but is highly prized as food.

The sturgeon is also taken in the Saskatchawan, and lakes communicating with it, and furnishes an excellent, but rather rich, article of food.

CHAPTER IV.

Leave Cumberland House—Mode of Travelling in Winter—Arrival at Carlton House—Stone Indians—Visit to a Buffalo Pound—Goitres—Departure from Carlton House—Isle à la Crosse—Arrival at Fort Chipeywan.

1820. January 18. THIS day we set out from Cumberland House for Carlton House; but previously to detailing the events of the journey, it may be proper to describe the necessary equipments of a winter traveller in this region, which I cannot do better than by extracting the following brief, but accurate, account of it from Mr. Hood's journal:—

"A snow-shoe is made of two light bars of wood, fastened together at their extremities, and projected into curves by transverse bars. The side bars have been so shaped by a frame, and dried before a fire, that the front part of the shoe turns up, like the prow of a boat, and the part behind terminates in an acute angle; the spaces between the bars are filled up with a fine netting of leathern thongs, except that part behind the main bar, which is occupied by the feet; the netting is there close and strong, and the foot is attached to the main bar by straps passing round the heel, but only fixing the toes, so that the heel rises after each step, and the tail of the shoe is dragged on the snow. Between the main bar and another in front of it, a small space is left, permitting the toes to descend a little in the act of raising the heel to make the step forward, which prevents their extremities from chafing. The length of a show-shoe is from four to six feet, and the breadth one foot and a

half, or one foot and three quarters, being adapted to the size of the wearer. The motion of walking in them is perfectly natural, for one shoe is level with the snow, when the edge of the other is passing over it. It is not easy to use them among bushes, without frequent overthrows, nor to rise afterwards without help. Each shoe weighs about two pounds when unclogged with snow. The northern Indian snow shoes differ a little from those of the southern Indians, having a greater curvature on the outside of each shoe; one advantage of which is, that when the foot rises the over-balanced side descends and throws off the snow. All the superiority of European art has been unable to improve the native contrivance of this useful machine.

"Sledges are made of two or three flat boards, curving upwards in front, and fastened together by transverse pieces of wood above. They are so thin that, if heavily laden, they bend with the inequalities of the surface over which they pass. The ordinary dog-sledges are eight or ten feet long, and very narrow, but the lading is secured to a lacing round the edges. The cariole used by the traders is merely a covering of leather for the lower part of the body, affixed to the common sledge, which is painted and ornamented according to the taste of the proprietor. Besides snow shoes, each individual carries his blanket, hatchet, steel, flint, and tinder, and generally fire-arms."

The general dress of the winter traveller is a *capot*, having a hood to put up under the fur cap in windy weather, or in the woods, to keep the snow from his neck; leathern trowsers and Indian stockings, which are closed at the ankles, round the upper part of his *mocassins*, or Indian shoes, to prevent the snow from getting into them. Over these he wears a blanket, or leathern coat, which is secured by a belt round his waist, to which his fire-bag, knife, and hatchet are suspended.

Mr. Back and I were accompanied by the seaman, John Hep-

burn; we were provided with two carioles and two sledges; and their drivers and dogs were furnished in equal proportions by the two Companies. Fifteen days' provision so completely filled the sledges, that it was with difficulty we found room for a small sextant, one suit of clothes, and three changes of linen, together with our bedding. Notwithstanding we thus restricted ourselves, and even loaded the carioles with part of the luggage, instead of embarking in them ourselves, we did not set out without considerable grumbling from the voyagers of both Companies, respecting the overlading of their dogs. However, we left the matter to be settled by our friends at the fort, who were more conversant with winter travelling than ourselves. Indeed, the loads appeared to us so great that we should have been inclined to listen to the complaints of the drivers. The weight usually placed upon a sledge, drawn by three dogs, cannot, at the commencement of a journey, be estimated at less than three hundred pounds, which, however, suffers a daily diminution from the consumption of provisions. The sledge itself weighs about thirty pounds. When the snow is hard frozen, or the track well trodden, the rate of travelling is about two miles and a half an hour including rests, or about fifteen miles a day. If the snow is loose, the speed is necessarily much less and the fatigue greater.

At eight in the morning of the 18th, we quitted the fort, and took leave of our hospitable friend, Governor Williams, whose kindness and attention I shall ever remember with gratitude. Dr. Richardson, Mr. Hood, and Mr. Connolly, accompanied us along the Saskatchawan until the snow became too deep for their walking without snow-shoes. We then parted from our associates, with sincere regret at the prospect of a long separation. Being accompanied by Mr. Mackenzie, of the Hudson's Bay Company, who was going to Isle à la Crosse, with four sledges under his charge, we formed quite a procession, keeping in an Indian file, in the track

Drawn by Lieut. Back R.N

Engraved by Edwd Finden.

MANNER OF MAKING A RESTING PLACE ON A WINTERS NIGHT.

March 15th 1820

of the man who preceded the foremost dogs; but, as the snow was deep, we proceeded slowly on the surface of the river, which is about three hundred and fifty yards wide, for the distance of six miles, which we went to-day. Its alluvial banks and islands are clothed with willows. At the place of our encampment we could scarcely find sufficient pine branches to floor "the hut," as the Orkney men term the place where travellers rest. Its preparation, however, consists only in clearing away the snow to the ground, and covering that space with pine branches, over which the party spread their blankets and coats, and sleep in warmth and comfort, by keeping a good fire at their feet, without any other canopy than the heaven, even though the thermometer should be far below zero.

The arrival at the place of encampment gives immediate occupation to every one of the party; and it is not until the sleeping-place has been arranged, and a sufficiency of wood collected as fuel for the night, that the fire is allowed to be kindled. The dogs alone remain inactive during this busy scene, being kept harnessed to their burdens until the men have leisure to unstow the sledges, and hang upon the trees every species of provision out of the reach of these rapacious animals. We had ample experience, before morning, of the necessity of this precaution, as they contrived to steal a considerable part of our stores, almost from underneath Hepburn's head, notwithstanding their having been well fed at supper.

This evening we found the mercury of our thermometer had sunk into the bulb, and was frozen. It arose again into the tube on being held to the fire, but quickly re-descended into the bulb on being removed into the air; we could not, therefore, ascertain by it the temperature of the atmosphere, either then or during our journey. The weather was perfectly clear.

January 19.—We arose this morning after the enjoyment of a sound and comfortable repose, and recommenced our journey at sun-rise, but made slow progress through the deep snow. The task

of beating the track for the dogs was so very fatiguing, that each of the men took the lead in turn, for an hour and a half. The scenery of the banks of the river improved as we advanced to-day; some firs and poplars were intermixed with the willows. We passed through two creeks, formed by islands, and encamped on a pleasant spot on the north shore, having only made six miles and three quarters actual distance.

The next day we pursued our course along the river; the dogs had the greatest difficulty in dragging their heavy burdens through the snow. We halted to refresh them at the foot of Sturgeon River, and obtained the latitude 53° 51′ 41″ N. This is a small stream, which issues from a neighbouring lake. We encamped near to Musquito Point, having walked about nine miles. The termination of the day's journey was a great relief to me, who had been suffering during the greater part of it, in consequence of my feet having been galled by the snow-shoes; this, however, is an evil which few escape on their initiation to winter travelling. It excites no pity from the more experienced companions of the journey, who travel on as fast as they can, regardless of the pain of the sufferer.

Mr. Isbester, and an Orkney man, joined us from Cumberland House, and brought some pemmican which we had left behind; a supply which was very seasonable after our recent loss. The general occupation of Mr. Isbester during the winter, is to follow or find out the Indians, and collect their furs, and his present journey will appear adventurous to persons accustomed to the certainty of travelling on a well-known road. He is going in search of a band of Indians, of whom no information had been received since last October, and his only guide for finding them was their promise to hunt in a certain quarter; but he looked at the jaunt with indifference, and calculated on meeting them in six or seven days, for which time only he had provision. Few persons in this country suffer more from want of food than those occasionally do who are employed on

this service. They are furnished with a sufficiency of provision to serve until they reach the part where the Indians are expected to be; but it frequently occurs that, on their arrival at the spot, they have gone elsewhere, and that a recent fall of snow has hidden their track, in which case the voyagers have to wander about in search of them; and it often happens, when they succeed in finding the Indians, that they are unprovided with meat. Mr. Isbester had been placed in this distressing situation only a few weeks ago, and passed four days without either himself or his dogs tasting food. At length, when he had determined on killing one of the dogs to satisfy his hunger, he happily met with a beaten track, which led him to some Indian lodges, where he obtained a supply of food.

The morning of the 21st was cold, but pleasant for travelling. We left Mr. Isbester and his companion, and crossed the peninsula of Musquito Point, to avoid a detour of several miles which the river makes. Though we put up at an early hour, we gained eleven miles this day. Our encampment was at the lower extremity of Tobin's Falls. The snow being less deep on the rough ice which enclosed this rapid, we proceeded, on the 22d, at a quicker pace than usual, though at the expense of great suffering to Mr. Back, myself, and Hepburn, all our feet being much galled. After passing Tobin's Falls, the river expands to the breadth of five hundred yards, and its banks are well wooded with pines, poplars, birch, and willows. Many tracks of moose-deer and wolves were observed near the encampment.

On the 23d the sky was generally overcast, and there were several snow showers. We saw two wolves and some foxes cross the river in the course of the day, and passed many tracks of the moose and red deer. Soon after we had encamped the snow fell heavily, which was an advantage to us after we had retired to rest, by its affording an additional covering to our blankets. The next morning, whilst at breakfast, two men arrived from Carlton on their way to Cumberland.

Having the benefit of their track, we were, to our great joy, able to get on at a quick pace without snow shoes. My only regret was, that the party proceeded too fast to allow of Mr. Back's halting occasionally, to note the bearings of the points, and delineate the course of the river*, without being left behind. As the provisions were getting short, I could not, therefore, with propriety, check the progress by interrupting the party; and, indeed, it appeared to me less necessary, as I understood the river had been carefully surveyed. In the afternoon, we had to resume the incumbrance of the snow-shoes, and to pass over a rugged part where the ice had been piled over a collection of stones. The tracks of animals were very abundant on the river, particularly near the remains of an old establishment, called the Lower Nippéween.

So much snow had fallen on the night of the 24th, that the track we intended to follow was completely covered, and our march to-day was very fatiguing. We passed the remains of two red-deer, lying at the basis of perpendicular cliffs, from the summits of which they had, probably, been forced by the wolves. These voracious animals, who are inferior in speed to the moose and red-deer, are said frequently to have recourse to this expedient in places where extensive plains are bounded by precipitous cliffs. Whilst the deer are quietly grazing, the wolves assemble in great numbers, and, forming a crescent, creep slowly towards the herd so as not to alarm them much at first, but when they perceive that they have fairly hemmed in the unsuspecting creatures, and cut off their retreat across the plain, they move more quickly, and with hideous yells terrify their prey and urge them to flight by the only open way, which is that towards the precipice; appearing to know, that when the herd is once at full speed, it is easily driven over the cliff, the rearmost urging on those that are before. The wolves then descend at their leisure, and feast

* This was afterwards done by Dr. Richardson during a voyage to Carlton in the spring.

on the mangled carcasses. One of these ferocious animals passed close to the person who was beating the track, but did not offer any violence. We encamped at sunset, after walking thirteen miles.

On the 26th, we were rejoiced at passing the half-way point, between Cumberland and Carlton. The scenery of the river was less agreeable beyond this point, as there was a scarcity of wood. One of our men was despatched after a red-deer that appeared on the bank. He contrived to approach near enough to fire twice, though without success, before the animal moved away. After a fatiguing march of seventeen miles, we put up at the upper Nippéween, a deserted establishment; and performed the comfortable operations of shaving and washing for the first time since our departure from Cumberland, the weather having been hitherto too severe. We passed an uncomfortable and sleepless night, and agreed next morning to encamp in future, in the open air, as preferable to the imperfect shelter of a deserted house without doors or windows.

The morning was extremely cold, but fortunately the wind was light, which prevented our feeling it severely; experience indeed had taught us that the sensation of cold depends less upon the state of temperature, than the force of the wind. An attempt was made to obtain the latitude, which failed, in consequence of the screw, which adjusts the telescope of the sextant, being immovably fixed, from the moisture upon it having frozen. The instrument could not be replaced in its case before the ice was thawed by the fire in the evening.

In the course of the day we passed the confluence of the south branch of the Saskatchawan, which rises from the rocky mountains near the sources of the northern branch of the Missouri. At Coles Falls which commence a short distance from the branch we found the surface of the ice very uneven, and many spots of open water.

We passed the ruins of an establishment, which the traders had

been compelled to abandon, in consequence of the intractable conduct and pilfering habits of the Assinéboine Indians; and we learnt that all the residents at a post on the south branch, had been cut off by the same tribe some years ago. We travelled twelve miles to-day. The wolves serenaded us through the night with a chorus of their agreeable howling, but none of them ventured near the encampment. Mr. Back's repose was disturbed by a more serious evil; his buffalo robe caught fire, and the shoes on his feet, being contracted by the heat, gave him such pain, that he jumped up in the cold, and ran into the snow as the only means of obtaining relief.

On the 28th we had a strong and piercing wind from N.W. in our faces, and much snow-drift, we were compelled to walk as quick as we could, and to keep constantly rubbing the exposed parts of the skin, to prevent their being frozen, but some of the party suffered in spite of every precaution. We descried three red-deer on the banks of the river, and were about to send the best marksmen after them, when they espied the party, and ran away. A supply of meat would have been very seasonable, as the men's provision became scanty, and the dogs were without food, except a little burnt leather. Owing to the scarcity of wood, we had to walk until a late hour, before a good spot for an encampment could be found, and had then come only eleven miles. The night was miserably cold; our tea froze in the tin pots before we could drink it, and even a mixture of spirits and water became quite thick by congelation; yet, after we lay down to rest, we felt no inconvenience, and heeded not the wolves, though they were howling within view.

The 29th was also very cold, until the sun burst forth, when the travelling became pleasant. The banks of the river are very scantily supplied with wood through the part we passed to-day. A long track on the south shore, called Holms Plains, is destitute of any thing like a tree, and the opposite bank has only stunted willows;

but, after walking sixteen miles, we came to a spot better wooded, and encamped opposite to a remarkable place, called by the voyagers "The Neck of Land."

On the thirtieth we directed our course round The Neck of Land, which is well clothed with pines and firs; though the opposite or western bank is nearly destitute of wood. This contrast between the two banks continued until we reached the commencement of what our companions called the barren grounds, when both the banks were alike bare. Vast plains extend behind the southern bank, which afford excellent pasturage for the buffalo, or other grazing animals. In the evening we saw a herd of the former, but could not get near to them. After walking fifteen miles we encamped. The men's provision having been entirely expended last night, we shared our small stock with them. The poor dogs had been toiling some days on the most scanty fare; their rapacity, in consequence, was unbounded; they forced open a deal box, containing tea, &c., to get at a small piece of meat which had been incautiously placed in it.

As soon as daylight permitted, the party commenced their march, in the expectation of reaching Carlton House to breakfast, but we did not arrive until noon, although the track was good. We were received by Mr. Prudens, the gentleman in charge of the post, with that friendly attention which Governor Williams's circular was calculated to ensure at every station; and were soon afterwards regaled with a substantial dish of buffalo steaks, which would have been thought excellent under any circumstances, but were particularly relished by us, though eaten without either bread or vegetables, after our travelling fare of dried meat and pemmican. After this repast, we had the comfort of changing our travelling dresses, which had been worn for fourteen days. This was a gratification which can only be truly estimated by those who may have been placed under similar circumstances. I was still in too great pain from

swellings in the ankles to proceed to La Montée, the North-West Company's establishment, distant about three miles; but Mr. Hallet, the gentleman in charge, came the following morning, and I presented to him the circular from Mr. S. Mac Gillivray. He had already been furnished, however, with a copy of it from Mr. Connolly and was quite prepared to contribute any assistance that we might require to forward our advance to the Athabasca.

Mr. Back and I having been very desirous to see some of the Stone Indians, who reside on the plains in this vicinity, learned with regret that a large band of them had left the house on the preceding day; but our curiosity was amply gratified by the appearance of some individuals, on the following and every subsequent day during our stay.

The looks of these people would have prepossessed me in their favour, but from the assurances I had received from the gentlemen of the posts, of their gross and habitual treachery. Their countenances are affable and pleasing, their eyes large and expressive, nose aquiline, teeth white and regular, the forehead bold, the cheek-bones rather high. Their figure is usually good, above the middle size, with slender, but well proportioned, limbs. Their colour is a light copper, and they have a profusion of very black hair, which hangs over the ears, and shades the face. Their dress, which I think extremely neat and convenient, consists of a vest and trowsers of leather fitted to the body; over these a buffalo robe is tastefully thrown. These dresses are in general cleaned with *white-mud*, a sort of marl, though some use *red-earth*, a kind of bog-iron-ore; but this colour neither looks so light, nor forms such an agreeable contrast as the white with the black hair of the robe. Their quiver hangs behind them, and in the hand is carried the bow, with an arrow always ready for attack or defence, and sometimes they have a gun; they also carry a bag containing materials for making a fire, some tobacco, the calumet or pipe, and whatever valuables they may

Drawn by Lieut. Back, R.N.

PORTRAIT OF A STONE INDIAN.

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possess. This bag is neatly ornamented with porcupine quills. Thus equipped, the Stone Indian bears himself with an air of perfect independence.

The only articles of European commerce they require in exchange for the meat they furnish to the trading post, are tobacco, knives, ammunition, and spirits, and occasionally some beads, but more frequently buttons, which they string in their hair as ornaments. A successful hunter will probably have two or three dozen of them hanging at equal distances on locks of hair, from each side of the forehead. At the end of these small coral bells are sometimes attached, which tingle at every motion of the head; a noise which seems greatly to delight the wearer; sometimes a string of them is bound round the head like a tiara; and a bunch of feathers gracefully crowns the head.

The Stone Indians steal whatever they can, particularly horses; these animals they maintain are common property, sent by the Almighty for the general use of man, and therefore may be taken wherever met with; still they admit of the right of the owners to watch them, and to prevent theft if possible. This avowed disposition on their part calls forth the strictest vigilance at the different posts; notwithstanding which the most daring attacks are often successfully made, sometimes on parties of three or four, but oftener on individuals. About two years ago a band of them had the audacity to attempt to take away some horses which were grazing before the gate of the N.W. Company's fort; and, after braving the fire from the few people then at the establishment through the whole day, and returning their shots occasionally, they actually succeeded in their enterprise. One man was killed on each side. They usually strip defenceless persons whom they meet of all their garments, but particularly of those which have buttons, and leave them to travel home in that state, however severe the weather. If resistance is expected, they not unfrequently murder before they attempt to rob.

The traders, when they travel, invariably keep some men on guard to prevent surprise, whilst the others sleep; and often practise the stratagem of lighting a fire at sunset, which they leave burning, and move on after dark to a more distant encampment—yet these precautions do not always baffle the depredators. Such is the description of men whom the traders of this river have constantly to guard against. It must require a long residence among them, and much experience of their manners, to overcome the painful apprehensions their hostility and threats are calculated to excite. Through fear of having their provision and supplies entirely cut off, the traders are often obliged to overlook the grossest offences, even murder, though the delinquents present themselves with unblushing effrontery almost immediately after the fact, and perhaps boast of having committed it. They do not, on detection, consider themselves under any obligation to deliver up what they have stolen without receiving an equivalent.

The Stone Indians keep in amity with their neighbours the Crees from motives of interest; and the two tribes unite in determined hostility against the nations dwelling to the westward, which are generally called Slave Indians—a term of reproach applied by the Crees to those tribes against whom they have waged successful wars. The Slave Indians are said greatly to resemble the Stone Indians, being equally desperate and daring in their acts of aggression and dishonesty towards the traders.

These parties go to war almost every summer, and sometimes muster three or four hundred horsemen on each side. Their leaders, in approaching the foe, exercise all the caution of the most skilful generals; and whenever either party considers that it has gained the best ground, or finds it can surprise the other, the attack is made. They advance at once to close quarters, and the slaughter is consequently great, though the battle may be short. The prisoners of either sex are seldom spared, but slain on the spot with wanton

cruelty. The dead are scalped, and he is considered the bravest person who bears the greatest number of scalps from the field. These are afterwards attached to his war dress, and worn as proofs of his prowess. The victorious party, during a certain time, blacken their faces and every part of their dress in token of joy, and in that state they often come to the establishment, if near, to testify their delight by dancing and singing, bearing all the horrid insignia of war, to display their individual feats. When in mourning they completely cover their dress and hair with white mud.

The Crees in the vicinity of Carlton House have the same cast of countenance as those about Cumberland, but are much superior to them in appearance, which is to be attributed to their living in a more abundant country. These men are more docile, tractable, and industrious, than the Stone Indians, and bring greater supplies of provision and furs to the posts. Their general mode of dress resembles that of the Stone Indians; but sometimes they wear cloth leggins, blankets, and other useful articles, when they can afford to purchase them. They decorate their hair with buttons, like the others.

The Crees procure guns from the traders, and use them in preference to the bow and arrow; and from them the Stone Indians often get supplied, either by stealth, gaming, or traffic. Like the rest of their nation, these Crees are remarkably fond of spirits, and would make any sacrifice to obtain them. I regretted to find the demand for this pernicious article had greatly increased in this department within the few last years. The following notice of these Indians is extracted from Dr. Richardson's Journal:—

"The Asseenaboine, termed by the Crees Asseeneepoytuck, or Stone Indians, are a tribe of Sioux, who speak a dialect of the Iroquois, one of the great divisions under which the American philologists have classed the known dialects of the Aborigines of North America. The Stone Indians, or, as they name themselves, *Eascab*,

originally entered this part of the country under the protection of the Crees, and in concert with them attacked and drove to the westward the former inhabitants of the banks of the Saskatchawan. They are still the allies of the Crees, but have now become more numerous than their former protectors. They exhibit all the bad qualities ascribed to the Mengwe or Iroquois, the stock from whence they are sprung. Of their actual number I could obtain no precise information, but it is very great. The Crees, who inhabit the plains, being fur hunters are better known to the traders.

"They are divided into two distinct bands, the Ammisk-watcheé-thinyoowuc or Beaver Hill Crees, who have about forty tents, and the Sackaweé-thinyoowuc, or Thick Wood Crees, who have thirty-five. The tents average nearly ten inmates each, which gives a population of seven hundred and fifty to the whole.

"The nations who were driven to the westward by the Eascab and Crees are termed, in general, by the latter, Yatcheé-thinyoowuc, which has been translated Slave Indians, but more properly signifies Strangers.

"They now inhabit the country around Fort Augustus, and towards the foot of the rocky mountains, and have increased in strength until they have become an object of terror to the Eascab themselves. They rear a great number of horses, make use of fire-arms, and are fond of European articles; in order to purchase which they hunt beaver and other furred animals, but they depend principally on the buffalo for subsistence.

"They are divided into five nations:—First, the Pawäustic-eythin-yoowuc, or Fall Indians, so named from their former residence on the falls of the Saskatchawan. They are the Minetarres, with whom Captain Lewis's party had a conflict on their return from the Missouri. They have about four hundred and fifty or five hundred tents; their language is very guttural and difficult.

"Second, the Peganoo-eythinyoowuc Pegans, or Muddy River

Indians, named in their own language Peganœ̀-koon, have four hundred tents.

" Third, the Meethco-thinyoowuc, or Blood Indians, named by themselves Kainœ̀-koon, have three hundred tents.

" Fourth, the Cuskœteh-waw-thésseetuck, or Black-foot Indians, in their own language Saxœkœ-koon, have three hundred and fifty tents.

" The last three nations, or tribes, the Pegans, Blood Indians, and Black-feet, speak the same language. It is pronounced in a slow and distinct tone, has much softness, and is easily acquired by their neighbours. I am assured by the best interpreters in the country, that it bears no affinity to the Cree, Sioux, or Chipewyan languages.

" Lastly, the Sassees, or Circees, have one hundred and fifty tents; they speak the same language with their neighbours, the Snare Indians, who are a tribe of the extensive family of the Chipewyans*."

On the 6th of February we accompanied Mr. Prudens on a visit to a Cree encampment, and to see a buffalo pound, both of them situated about six miles from the house; we found seven tents pitched within a small cluster of pines, which adjoined the pound. The largest, which we entered, belonged to the chief, who was

* " As the subject may be interesting to philologists, I subjoin a few words of the Blackfoot language:—

Peestàh kan,	tobacco.	Stoo-an,	a knife.
Moohksee,	an awl.	Sassoopats,	ammunition.
Nappœ-oòhkee,	rum.	Meenee,	beads.
Cook keet,	give me.	Poommees,	fat.
Eeninee,	buffalo.	Miss ta poot,	keep off.
Pooxāpoot,	come here.	Saw,	no.
Kat œt sits,	none, I have none.	Stwee,	cold; it is cold.
Keet stā kee,	a beaver.	Pennākōmit,	a horse.
Naum`,	a bow.	Ahseeu,	good."

absent, but came in directly afterwards, on being informed of our arrival. The old man (about sixty) welcomed us with a hearty shake of the hand, and the customary salutation of " What cheer?" an expression which they have gained from the traders. As we had been expected, they had caused the tent to be neatly arranged, fresh grass was spread on the ground, buffalo robes were placed on the side opposite the door for us to sit on, and a kettle was on the fire to boil meat for us.

After a few minutes' conversation, an invitation was given to the Chief and his hunters to smoke the calumet with us, as a token of our friendship: this was loudly announced through the camp, and ten men from the other tents immediately joined our party. On their entrance the women and children, whose presence on such occasions is contrary to etiquette, withdrew. The calumet, having been prepared and lighted by Mr. Prudens's clerk, was presented to the Chief, who, on receiving it, performed the following ceremony before he commenced smoking:—He first pointed the stem to the south, then to the west, north, and east, and afterwards to the heavens, the earth, and the fire, as an offering to the presiding spirits;—he took three whiffs only, and then passed the pipe to his next companion, who took the same number of whiffs, and so did each person as it went round. After the calumet had been replenished, the person who then commenced repeated only the latter part of the ceremony, pointing the stem to the heaven, the earth, and the fire. Some spirits, mixed with water, were presented to the old man, who, before he drank, demanded a feather, which he dipped into the cup several times, and sprinkled the moisture on the ground, pronouncing each time a prayer. His first address to the Keetchee Manitou, or Great Spirit, was, that buffalo might be abundant every where, and that plenty might come into their pound. He next prayed, that the other animals might be numerous, and particularly those which were valuable for their furs, and then desired that the party

present might escape the sickness which was then prevalent, and be blessed with constant health. Some other supplications followed, which we could not get interpreted without interrupting the whole proceeding. To each of these supplications the whole Indian party assented by exclaiming Aha; when he had finished them the old man drank a little and passed the cup round. After these ceremonies each person smoked at his leisure, and they engaged in a general conversation, which I regretted not understanding, as it seemed to be very humorous, exciting frequent bursts of laughter. The younger men, in particular, appeared to ridicule the abstinence of one of the party, who neither drank nor smoked. He bore their jeering with perfect composure, and assured them, as I was told, they would be better if they would follow his example. I was happy to learn from Mr. Prudens, that this man was not only one of the best hunters, but the most cheerful and contented man of the tribe.

Four Stone Indians arrived at this time, and were invited into the tent, but one only accepted the invitation and partook of the fare. When Mr. Prudens heard the others refuse, he gave immediate directions that our horses should be narrowly watched, as he suspected these fellows wished to carry them off. Having learned that they considered Mr. Back and myself to be war chiefs, possessing great power, and that they expected we should make some address to them, I desired them to be kind to the traders, and to be industrious in procuring them provision and furs, and to refrain from stealing their stores and horses; and I assured them, if I heard of their continuing to behave kindly, that I would mention their good conduct in the strongest terms to their Great Father across the sea, (by which appellation they designate the King), whose favourable consideration they had been taught by the traders to value most highly.

They all promised to follow my advice, and assured me it was

not they, but the Stone Indians, who robbed and annoyed the traders. The Stone Indian who was present, heard this accusation against his tribe quite unmoved, but he probably did not understand the whole of the communication. We left them to finish their rum, and went to look round the lodges, and examine the pound.

The greatest proportion of labour, in savage life, falls to the women; we now saw them employed in dressing skins, and conveying wood, water, and provision. As they have often to fetch the meat from some distance, they are assisted in this duty by their dogs, which are not harnessed in sledges, but carry their burthens in a manner peculiarly adapted to this level country. Two long poles are fastened by a collar to the dog's neck, their ends trail on the ground, and are kept at a proper distance by a hoop, which is lashed between them, immediately behind the dog's tail; the hoop is covered with network, upon which the load is placed.

The boys were amusing themselves by shooting arrows at a mark, and thus training to become hunters. The Stone Indians are so expert with the bow and arrow, that they can strike a very small object at a considerable distance, and will shoot with sufficient force to pierce through the body of a buffalo when near.

The buffalo pound was a fenced circular space of about a hundred yards in diameter; the entrance was banked up with snow, to a sufficient height to prevent the retreat of the animals that may once have entered. For about a mile on each side of the road leading to the pound, stakes were driven into the ground at nearly equal distances of about twenty yards; these were intended to look like men, and to deter the animals from attempting to break out on either side. Within fifty or sixty yards from the pound, branches of trees were placed between these stakes to screen the Indians, who lie down behind them to await the approach of the buffalo.

The principal dexterity in this species of chase is shewn by the horsemen, who have to manœuvre round the herd in the plains so as

Drawn by Lieut. Back, R.N.

Engraved by Edwd. Finden.

A BUFFALO POUND.

Feb. 8. 1820.

to urge them to enter the roadway, which is about a quarter of a mile broad. When this has been accomplished, they raise loud shouts, and, pressing close upon the animals, so terrify them that they rush heedlessly forward towards the snare. When they have advanced as far as the men who are lying in ambush, they also rise, and increase the consternation by violent shouting and firing guns. The affrighted beasts, having no alternative, run directly into the pound, where they are quickly despatched, either with an arrow or gun.

There was a tree in the centre of the pound, on which the Indians had hung strips of buffalo flesh and pieces of cloth as tributary or grateful offerings to the Great Master of Life; and we were told that they occasionally place a man in the tree to sing to the presiding spirit as the buffaloes are advancing, who must keep his station until the whole that have entered are killed. The annexed print, from a sketch by Mr. Back, will shew clearly the nature of this species of hunting, which, in fact, is very similar to that of taking elephants on the Island of Ceylon, but upon a smaller scale.

The Crees complained to us of the audacity of a party of Stone Indians, who, two nights before, had stripped their revered tree of many of its offerings, and had injured their pound by setting their stakes out of the proper places.

Other modes of killing the buffalo are practised by the Indians with success:—of these the hunting them on horseback requires most dexterity. An expert hunter, when well mounted, dashes at the herd, and chooses an individual which he endeavours to separate from the rest. If he succeeds, he contrives to keep him apart by the proper management of his horse, though going at full speed. Whenever he can get sufficiently near for a ball to penetrate the beast's hide, he fires, and seldom fails of bringing the animal down; though of course he cannot rest the piece against the shoulder, nor take a deliberate aim. On this service the hunter is often exposed to considerable danger from the fall of his horse in the numerous holes

which the badgers make in these plains, and also from the rage of the buffalo, which, when closely pressed, often turns suddenly, and, rushing furiously on the horse, frequently succeeds in wounding it, or dismounting the rider. Whenever the animal shews this disposition, which the experienced hunter will readily perceive, he immediately pulls up his horse, and goes off in another direction.

When the buffaloes are on their guard, horses cannot be used in approaching them; but the hunter dismounts at some distance, and crawls in the snow towards the herd, pushing his gun before him. If the buffaloes happen to look towards him, he stops, and keeps quite motionless, until their eyes are turned in another direction; by this cautious proceeding a skilful person will get so near as to be able to kill two or three out of the herd. It will easily be imagined this service cannot be very agreeable when the thermometer stands 30° or 40° below zero, as sometimes happens in this country.

As we were returning from the tents, the dogs that were harnessed to three sledges, in one of which Mr. Back was seated, set off in pursuit of a buffalo-calf. Mr. Back was speedily thrown from his vehicle, and had to join me in my horse-cariole. Mr. Herriot having gone to recover the dogs, found them lying exhausted beside the calf, which they had baited until it was as exhausted as themselves. Mr. Herriot, to shew us the mode of hunting on horseback, or, as the traders term it, running of the buffalo, went in chase of a cow, and killed it after firing three shots.

The buffalo is a huge and shapeless animal, quite devoid of grace or beauty; particularly awkward in running, but by no means slow; when put to his speed, he plunges through the deep snow very expeditiously; the hair is dark brown, very shaggy, curling about the head, neck, and hump, and almost covering the eye, particularly in the bull, which is larger and more unsightly than the cow. The most esteemed part of the animal is the hump, called by the Canadians *bos*, by the Hudson's Bay people the *wig*; it is merely a strong

muscle, on which nature at certain seasons forms a considerable quantity of fat. It is attached to the long spinous processes of the first dorsal vertebræ, and seems to be destined to support the enormous head of the animal. The meat which covers the spinal processes themselves, after the wig is removed, is next in esteem for its flavour and juiciness, and is more exclusively termed the hump by the hunters.

The party was prevented from visiting a Stone Indian encampment by a heavy fall of snow, which made it impracticable to go and return the same day. We were dissuaded from sleeping at their tents by the interpreter at the N.W. post, who told us they considered the diseases of hooping-cough and measles, under which they were now suffering, to have been introduced by some white people recently arrived in the country, and that he feared those who had lost relatives, imagining we were the persons, might vent their revenge on us. We regretted to learn these diseases have been very destructive among the tribes along the Saskatchawan, and that they have carried off about three hundred persons, Crees and Asseenaboines, within the trading circle of these establishments. The interpreter also informed us of another bad trait peculiar to the Stone Indians. Though they receive a visitor kindly at their tents, and treat him very hospitably during his stay, yet it is very probable they will despatch some young men to way-lay and rob him in going towards the post: indeed all the traders assured us it was more necessary to be vigilantly on our guard on the occasion of a visit to them, than at any other time.

Carlton House, (which our observations place in latitude 52° 50′ 47″ N., longitude, 106° 12′ 42″ W., variation 20° 44′ 47″ E.) is pleasantly situated about a quarter of a mile from the river's side on the flat ground under the shelter of the high banks that bound the plains. The land is fertile, and produces, with little trouble, ample returns of wheat, barley, oats and potatoes. The ground is prepared

for the reception of these vegetables, about the middle of April, and when Dr. Richardson visited this place on May 10th, the blade of wheat looked strong and healthy. There were only five acres in cultivation at the period of my visit. The prospect from the fort must be pretty in summer, owing to the luxuriant verdure of this fertile soil; but in the uniform and cheerless garb of winter, it has little to gratify the eye.

Beyond the steep bank behind the house, commences the vast plain, whose boundaries are but imperfectly known; it extends along the south branch of the Saskatchawan, and towards the sources of the Missouri, and Asseenaboine rivers, being interrupted through the whole of this great space, by few hills, or even rising grounds. The excellent pasturage furnishes food in abundance, to a variety of grazing animals, of which the buffalo, red-deer, and a species of antelope, are the most considerable. Their presence naturally attracts great hordes of wolves, which are of two kinds, the large, and the small. Many bears prowl about the banks of this river in summer; of these the grizzle bear is the most ferocious, and is held in dread both by Indians and Europeans. The traveller, in crossing these plains, not only suffers from the want of wood and water, but is also exposed to hazard from his horse stumbling in the numerous badger-holes. In many large districts, the only fuel is the dried dung of the buffalo; and when a thirsty traveller reaches a spring, he has not unfrequently the mortification to find that it consists of salt water.

Carlton House, and La Montée, are provision-posts, an inconsiderable quantity of furs being obtained at either of them. The provisions are procured in the winter season from the Indians, in the form of dried meat and fat, and when converted by mixture into pemmican, furnish the principal support of the voyagers, in their passages to and from the depôts in the summer. A considerable quantity of it is also kept for winter use, at most of the fur-posts,

as the least bulky article that can be taken on a winter journey. The mode of making pemmican is very simple, the meat is dried by the Indians in the sun, or over a fire, and pounded by beating it with stones when spread on a skin. In this state it is brought to the forts, where the admixture of hair is partially sifted out, and a third part of melted fat incorporated with it, partly by turning them over with a wooden shovel, partly by kneading them together with the hands. The pemmican is now firmly pressed into leathern bags, each capable of containing eighty-five pounds, and being placed in an airy place to cool, is fit for use. It keeps in this state, if not allowed to get wet, very well for one year, and with great care it may be preserved good for two. Between three and four hundred bags were made here by each of the companies this year.

There were eight men, besides Mr. Prudens and his clerk, belonging to Carlton House. At La Montée there were seventy Canadians and half-breeds, and sixty women and children, who consumed upwards of seven hundred pounds of buffalo meat daily, the allowance per diem for each man being eight pounds.

There are other provision posts, Fort Augustus and Edmonton, farther up the river, from whence some furs are also procured. The Stone Indians have threatened to cut off the supplies in going up to these establishments, to prevent their enemies from obtaining ammunition, and other European articles; but as these menaces have been so frequently made without being put in execution, the traders now hear them without any great alarm, though they take every precaution to prevent being surprised. Mr. Back and I were present when an old Cree communicated to Mr. Prudens, that the Indians spoke of killing all the white people in that vicinity this year, which information he received with perfect composure, and was amused, as well as ourselves, with the man's judicious remark which immediately followed, "A pretty state we shall then be in, without the goods you bring us."

The following remarks on a well-known disease are extracted from Dr. Richardson's journal:—

"Bronchocele, or Goitre, is a common disorder at Edmonton. I examined several of the individuals afflicted with it, and endeavoured to obtain every information on the subject from the most authentic sources. The following facts may be depended upon. The disorder attacks those only who drink the water of the river. It is indeed in its worst state confined almost entirely to the half-breed women and children, who reside constantly at the fort, and make use of river water, drawn in the winter through a hole made in the ice. The men, from being often from home on journies through the plain, when their drink is melted snow, are less affected; and, if any of them exhibit, during the winter, some incipient symptoms of the complaint, the annual summer voyage to the sea coast generally effects a cure. The natives who confine themselves to snow water in the winter, and drink of the small rivulets which flow through the plains in the summer, are exempt from the attacks of this disease.

These facts are curious, inasmuch as they militate against the generally-received opinion that the disease is caused by drinking snow water; an opinion which seems to have originated from bronchocele being endemial to sub-alpine districts.

"The Saskatchawan, at Edmonton, is clear in the winter, and also in the summer, except during the May and July floods. The distance from the rocky mountains, (which I suppose to be of primitive formation,) is upwards of one hundred and thirty miles. The neighbouring plains are alluvial, the soil is calcareous, and contains numerous travelled fragments of a very new magnesian limestone. At a considerable distance below Edmonton, the river, continuing its course through the plains, becomes turbid, and acquires a white colour. In this state it is drunk by the inmates of Carlton House, where the disease is known only by name. It is said that the inhabitants of

Rocky Mountain House, sixty miles nearer the source of the river are more severely affected than those at Edmonton. The same disease occurs near the sources of Elk and Peace Rivers; but, in those parts of the country which are distant from the Rocky Mountain Chain, it is unknown, although melted snow forms the only drink of the natives for nine months of the year.

"A residence of a single year at Edmonton is sufficient to render a family bronchocelous. Many of the goitres acquire great size. Burnt sponge has been tried, and found to remove the disease, but an exposure to the same cause immediately reproduces it.

"A great proportion of the children of women who have goitres, are born idiots, with large heads, and the other distinguishing marks of *cretins*. I could not learn whether it was necessary that both parents should have goitres, to produce cretin children; indeed the want of chastity in the half-breed women would be a bar to the deduction of any inference on this head."

February 8.—Having recovered from the swellings and pains which our late march from Cumberland had occasioned, we prepared for the commencement of our journey to Isle à la Crosse, and requisitions were made on both the establishments for the means of conveyance, and the necessary supply of provisions for the party, which were readily furnished. On the 9th the carioles and sledges were loaded, and sent off after breakfast; but Mr. Back and I remained till the afternoon, as Mr. Prudens had offered that his horses should convey us to the encampment. At 3 P.M. we parted from our kind host, and in passing through the gate were honoured with a salute of musketry. After riding six miles, we joined the men at their encampment, which was made under the shelter of a few poplars. The dogs had been so much fatigued in wading through the very deep snow with their heavy burdens, having to drag upwards of ninety pounds weight each, that they could get no farther. Soon after our

arrival, the snow began to fall heavily, and it continued through the greater part of the night.

Our next day's march was therefore particularly tedious, the snow being deep, and the route lying across an unvarying level, destitute of wood, except one small cluster of willows. In the afternoon we reached the end of the plain, and came to an elevation, on which poplars, willows, and some pines grew, where we encamped, having travelled ten miles. We crossed three small lakes, two of fresh water, and one of salt, near the latter of which we encamped, and were, in consequence, obliged to use for our tea water made from snow, which has always a disagreeable taste.

We had scarcely ascended the hill on the following morning, when a large herd of red deer was perceived grazing at a little distance; and, though we were amply supplied with provision, our Canadian companions could not resist the temptation of endeavouring to add to our stock. A half-breed hunter was therefore sent after them. He succeeded in wounding one, but not so as to prevent its running off with the herd, in a direction wide of our course. A couple of rabbits and a brace of wood partridges were shot in the afternoon. There was an agreeable variety of hill and dale in the scenery we passed through to-day; and sufficient wood for ornament, but not enough to crowd the picture. The valleys were intersected by several small lakes and pools, whose snowy covering was happily contrasted with the dark green of the pine-trees which surrounded them. After ascending a moderately high hill by a winding path through a close wood, we opened suddenly upon Lake Iroquois, and had a full view of its picturesque shores. We crossed it and encamped.

Though the sky was cloudless, yet the weather was warm. We had the gratification of finding a beaten track soon after we started on the morning of the 12th, and were thus enabled to walk briskly. We crossed at least twenty hills, and found a small lake or pool at

the foot of each. The destructive ravages of fire were visible during the greater part of the day. The only wood we saw for miles together consisted of pine-trees, stript of their branches and bark by this element: in other parts poplars alone were growing, which we have remarked invariably to succeed the pine after a conflagration, We walked twenty miles to-day, but the direct distance was only sixteen miles.

The remains of an Indian hut were found in a deep glen, and close to it was placed a pile of wood, which our companions supposed to cover a deposit of provision. Our Canadian voyagers, induced by an insatiable desire of procuring food, proceeded to remove the upper pieces, and examine its contents; when, to their surprise, they found the body of a female, clothed in leather, which appeared to have been recently placed there. Her former garments, the materials for making a fire, a fishing-line, a hatchet, and a bark dish, were laid beside the corpse. The wood was carefully replaced. A small owl, perched on a tree near the spot, called forth many singular remarks from our companions, as to its being a good or bad omen.

We walked the whole of the 13th over flat meadow-land, which is much resorted to by the buffalo at all seasons. We saw some herds, but our hunters were too unskilful to get within shot. In the afternoon we reached the Stinking Lake, which is nearly of an oval form. Its shores are very low and swampy, to which circumstances, and not to the bad quality of the waters, it owes its Indian name. Our observations place its western part in latitude 53° 25′ 24″ N., longitude 107° 18′ 58″ W., variation 20° 32′ 10″ E.

After a march of fifteen miles and a half, we encamped among a few pines, at the only spot at which we saw sufficient wood for making our fire during the day. The next morning, about an hour after we had commenced our march, we came upon a beaten track, and perceived recent marks of snow-shoes. In a short time an Iroquois joined us, who was residing with a party of Cree Indians, to secure

the meat and furs they should collect, for the North-West Company. He accompanied us as far as the stage on which his meat was placed, and then gave us a very pressing invitation to halt for the day and partake of his fare; which, as the hour was too early, we declined, much to the annoyance of our Canadian companions, who had been cherishing the prospect of indulging their amazing appetites at this well-furnished store, ever since the man had been with us. He gave them, however, a small supply previous to our party. The route now crossed some ranges of hills, on which fir, birch, and poplar, grew so thickly, that we had much difficulty in getting the sledges through the narrow pathway between them. In the evening we descended from the elevated ground, crossed three swampy meadows, and encamped at their northern extremity, within a cluster of large pine-trees, the branches of which were elegantly decorated with abundance of a greenish yellow lichen. Our march was ten miles. The weather was very mild, almost too warm for the exercise we were taking.

We had a strong gale from the N.W. during the night, which subsided as the morning opened. One of the sledges had been so much broken yesterday amongst the trees, that we had to divide its cargo among the others. We started after this had been arranged, and finding almost immediately a firm track, we soon arrived at some Indian lodges to which it led. The inhabitants were Crees, belonging to the posts on the Saskatchawan, from whence they had come to hunt beaver. We made but a short stay, and proceeded through a Swamp to Pelican Lake. Our view to the right was bounded by a range of lofty hills, which extended for several miles in a north and south direction, which, it may be remarked, has been that of all the hilly land we have passed since quitting the plain.

Pelican Lake is of an irregular form, about six miles from east to west, and eight from north to south; it decreases to the breadth of a mile towards the northern extremity, and is there terminated by a

creek. We went up this creek for a short distance, and then struck into the woods, and encamped among a cluster of the firs, which the Canadians term cyprès *(pinus inops)*; having come fourteen miles and a half.

February 16.—Shortly after commencing the journey to-day, we met an Indian and his family who had come from the houses at Green Lake; they informed us the track was well beaten the whole way. We, therefore, put forth our utmost speed in the hope of reaching them by night; but were disappointed, and had to halt at dark, about twelve miles from them, in a fisherman's hut, which was unoccupied. Frequent showers of snow fell during the day, and the atmosphere was thick and gloomy.

We started at an early hour the following morning, and reached the Hudson's Bay Company's post to breakfast, and were received very kindly by Mr. Mac Farlane, the gentleman in charge. The other establishment, situated on the opposite side of the river, was under the direction of Mr. Dugald Cameron, one of the partners of the North-West Company, on whom Mr. Back and I called soon after our arrival, and were honoured with a salute of musquetry.

These establishments are small, but said to be well situated for the procuring of furs; as the numerous creeks in their vicinity are much resorted to by the beaver, otter, and musquash. The residents usually obtain a superabundant supply of provision. This season, however, they have barely had sufficient for their own support, owing to the epidemic which has incapacitated the Indians for hunting. The Green Lake lies nearly north and south, is eighteen miles in length, and does not exceed one mile and a half of breadth in any part. The water is deep, and it is in consequence one of the last lakes in the country that is frozen. Excellent tittameg and trout are caught in it from March to December, but after that time most of the fish remove to some larger lake.

We remained two days, awaiting the return of some men who had

been sent to the Indian lodges for meat, and who were to go on with us. Mr. Back and I did not need this rest, having completely surmounted the pain which the walking in snow-shoes had occasioned. We dined twice with Mr. Cameron, and received from him many useful suggestions respecting our future operations. This gentleman having informed us that provisions would, probably, be very scarce next spring in the Athabasca department, in consequence of the sickness of the Indians during the hunting season, undertook at my request to cause a supply of pemmican to be conveyed from the Saskatchawan to Isle à la Crosse for our use during the winter, and I wrote to apprize Dr. Richardson and Mr. Hood, that they would find it at the latter post when they passed; and also to desire them to bring as much as the canoes would stow from Cumberland.

The atmosphere was clear and cold during our stay; observations were obtained at the Hudson Bay fort, lat. 54° 16′ 10″ N., long. 107° 29′ 52″ W., var. 22° 6′ 36″ E.

February 20.—Having been equipped with carioles, sledges, and provisions, from the two posts, we this day recommenced our journey, and were much amused by the novelty of the salute given at our departure, the guns being principally fired by the half-breed women in the absence of the men. Our course was directed to the end of the lake, and for a short distance along a small river; we then crossed the woods to the beaver river, which we found to be narrow and very serpentine, having moderately high banks. We encamped about one mile and a half further up among poplars. The next day we proceeded along the river; it was winding, and about two hundred yards broad. We passed the mouths of two rivers whose waters it receives; the latter one, we were informed, is a channel by which the Indians go to the Lesser Slave Lake. The banks of the river became higher as we advanced, and were furnished with pines, poplars, and willows.

Though the weather was very cold, we travelled more comfortably

than at any preceding time since our departure from Cumberland, as we were enabled, by having light carioles, to ride nearly the whole day, and to be warmly covered up with a buffalo robe. Mr. M'Leod, of the North-West Company, joined us. He had kindly brought some things from Green Lake, which our sledges could not carry. Pursuing our route along the river, we reached at an early hour the upper extremity of the "Grand Rapid," where the ice was so rough that the carioles and sledges had to be conveyed across a point of land. Soon after noon we left the river, inclining N.E., and directed our course N.W., until we reached Long Lake, and encamped at its northern extremity, having come twenty-three miles. This lake is about fourteen miles long, and from three quarters to one mile and a half broad; its shores and islands low, but well wooded. There were frequent snow-showers during the day.

February 23.—The night was very stormy, but the wind became more moderate in the morning. We passed to-day through several nameless lakes and swamps before we came to Train Lake, which received its name from being the place where the traders procured the birch to make the sledges, or traineaux; but this wood has been all used, and there only remain pines and a few poplars. We met some sledges laden with fish, kindly sent to meet us by Mr. Clark, of the Hudson's Bay Company, directly he heard of our approach. Towards the evening the weather became much more unpleasant; we were exposed to a piercingly cold wind, and much snow-drift, in traversing Isle à la Crosse Lake; we were, therefore, highly pleased at reaching the Hudson's Bay House by six P.M. We were received in the most friendly manner by Mr. Clark, and honoured by volleys of musketry on our arrival. Similar marks of attention were shewn to us on the following day by Mr. Bethune, the partner in charge of the North-West Company's fort. I found here the letters which I had addressed to the partners of the North-West Company, in the Athabasca, from Cumberland, in November

last. This circumstance convinced us of the necessity of our present journey.

These establishments are situated on the southern side of the lake, and close to each other. They are forts of considerable importance, being placed at a point of communication with the English River, the Athabasca, and Columbia Districts. The country around them is low, and intersected with water, and was formerly much frequented by beavers and otters, which, however, have been so much hunted by the Indians, that their number is greatly decreased. The Indians frequenting these forts are the Crees and some Chipewyans; they scarcely ever come except in the spring and autumn; in the former season to bring their winter's collection of furs, and in the latter to get the stores they require.

Three Chipewyan lads came in during our stay, to report what furs the band to which they belonged had collected, and to desire they might be sent for; the Indians having declined bringing either furs or meat themselves, since the opposition between the Companies commenced. Mr. Back drew the portrait of one of the boys.

Isle à la Crosse lake receives its name from an island situated near the forts, on which the Indians formerly assembled annually to amuse themselves at the game of the Cross. It is justly celebrated for abundance of the finest tittameg, which weigh from five to fifteen pounds. The residents live principally upon this most delicious fish, which fortunately can be eaten a long time without producing any disrelish. They are plentifully caught with nets throughout the year, except for two or three months.

March 4.—We witnessed the Aurora Borealis very brilliant, for the second time since our departure from Cumberland. A winter encampment is not a favourable situation for viewing this phenomenon, as the trees in general hide the sky. Arrangements had been made for recommencing our journey to-day, but the wind was

stormy, and the snow had drifted too much for travelling with comfort; we therefore stayed and dined with Mr. Bethune, who promised to render every assistance in getting pemmican conveyed to us from the Saskatchawan, to be in readiness for our canoes, when they might arrive in the spring; Mr. Clark has also engaged to procure six bags for us, and to furnish our canoes with any other supplies which may be wanted, and can be spared from his post, and to contribute his aid in forwarding the pemmican to the Athabasca, if our canoes cannot carry it all.

I feel greatly indebted to Mr. Clark, for much valuable information respecting the country and the Indians residing to the north of Slave Lake, and for furnishing me with a list of stores he supposed we should require. This gentleman had resided some years on Mackenzie's River, and had been once so far towards its mouth as to meet the Esquimaux in great numbers. But they assumed such a hostile attitude, that he deemed it unadvisable to attempt opening any communication with them, and retreated as speedily as he could.

The observations we obtained here shewed that the chronometers had varied their rates a little, in consequence of the jolting of the carioles in which we rode; but their errors and rates were ascertained previous to our departure. We observed the position of this fort to be latitude 55° 25′ 35″ N., longitude 107° 51′ 00″ W., by lunars reduced back from Fort Chipewyan, variation 22° 15′ 48″ W., dip 84° 13′ 35″.

March 5.—We recommenced our journey this morning, having been supplied with the means of conveyance by both the companies in equal proportions. Mr. Clark accompanied us with the intention of going as far as the boundary of his district. This gentleman was an experienced winter traveller, and we derived much benefit from his suggestions; he caused the men to arrange the encampment with more attention to comfort and shelter than our former com-

panions had done. After marching eighteen miles we put up on Gravel Point, in the Deep River.

At nine the next morning, we came to the commencement of Clear Lake. We crossed its southern extremes, and then went over a point of land to Buffalo Lake, and encamped after travelling twenty-six miles. After supper we were entertained until mid-night with paddling songs, by our Canadians who required very little stimulus beside their natural vivacity, to afford us this diversion. The next morning we arrived at the establishments which are situated on the western side of the lake, near to a small stream, called the Beaver River. They were small log buildings, hastily erected last October, for the convenience of the Indians who hunt in the vicinity. Mr. Mac Murray, a partner in the N.W. Company, having sent to Isle à la Crosse an invitation to Mr. Back and me, our carioles were driven to his post, and we experienced the kindest reception. These posts are frequented by only a few Indians, Crees, and Chipewyans. The country round is not sufficiently stocked with animals to afford support to many families, and the traders almost entirely subsist on fish caught in the autumn, prior to the lake being frozen. The water being shallow, the fish remove to a deeper part, as soon as the lake is covered with ice. The Aurora Borealis was brilliantly displayed on both the nights we remained here, but particularly on the 7th, when its appearances were most diversified, and the motion extremely rapid. Its coruscations occasionally concealed from sight stars of the first magnitude in passing over them, at other times these were faintly discerned through them; once I perceived a stream of light to illumine the under surface of some clouds as it passed along. There was no perceptible noise.

Mr. Mac Murray gave a dance to his voyagers and the half-breed women; this is a treat which they expect on the arrival of any stranger at the post.

We were presented by this gentleman, with the valuable skin of a black fox, which he had entrapped some days before our arrival; it was forwarded to England with other specimens.

Our observations place the North-West Company's house in latitude 55° 53′ 00″ N., longitude 108° 51′ 10″ W.; variation 22° 33″ 22′ E.

The shores of Buffalo Lake are of moderate height, and well wooded, but immediately beyond the bank the country is very swampy and intersected with water in every direction. At some distance from the western side there is a conspicuous hill, which we hailed with much pleasure, as being the first interruption to the tediously uniform scene we had for some time passed through.

On the 10th we recommenced our journey after breakfast and travelled quickly, as we had the advantage of a well-beaten track. At the end of eighteen miles we entered upon the river "Loche" which has a serpentine course, and is confined between alluvial banks that support stunted willows and a few pines; we encamped about three miles further on; and in the course of the next day's march perceived several holes in the ice, and many unsafe places for the sledges. Our companions said the ice of this river is always in the same insecure state, even during the most severe winter, which they attributed to warm springs. Quitting the river we crossed a portage and came upon the Methye Lake, and soon afterwards arrived at the trading posts situated on the western side of it. These were perfect huts, which had been hastily built after the commencement of the last winter. We here saw two hunters who were Chipewyan half-breeds, and made many inquiries of them respecting the countries we expected to visit, but we found them quite ignorant of every part beyond the Athabasca Lake. They spoke of Mr. Hearne and of his companion Matonnabee, but did not add to our stock of information respecting that journey. It had happened before their

birth, but they remembered the expedition of Sir Alexander Mackenzie towards the sea.

This is a picturesque lake, about ten miles long and six broad, and receives its name from a species of fish caught in it. This fish, the methye, is not much esteemed; the residents never eat any part but the liver except through necessity, the dogs dislike even that. The tittameg and trout are also caught in the fall of the year. The position of the houses by our observations is latitude 56° 24″ 20′ N., longitude 109° 23′ 06″ W., variation 22° 50′ 28″ E.

On the 13th we renewed our journey and parted from Mr. Clark, to whom we were much obliged for his hospitality and kindness. We soon reached the Methye portage, and had a very pleasant ride across it in our carioles. The track was good and led through groups of pines, so happily placed that it would not have required a great stretch of imagination to fancy ourselves driving through a well arranged park. We had now to cross a small lake, and then gradually ascended hills beyond it, until we arrived at the summit of a lofty chain of mountains commanding the most picturesque and romantic prospect we had yet seen in this country. Two ranges of high hills run parallel to each other for several miles, until the faint blue haze hides their particular characters, when they slightly change their course, and are lost to the view. The space between them is occupied by nearly a level plain, through which a river pursues a meandering course, and receives supplies from the creeks and rills issuing from the mountains on each side. The prospect was delightful even amid the snow, and though marked with all the cheerless characters of winter; how much more charming must it be when the trees are in leaf, and the ground is arrayed in summer verdure! Some faint idea of the difference was conveyed to my mind by witnessing the effect of the departing rays of a brilliant sun. The distant prospect, however, is surpassed in grandeur

by the wild scenery which appeared immediately below our feet. There the eye penetrates into vast ravines from two to three hundred feet in depth, that are clothed with trees, and lie on either side of the narrow pathway descending to the river over eight successive ridges of hills. At one spot termed the Cockscomb, the passenger stands insulated as it were on a small slip, where a false step might precipitate him into the glen. From this place Mr. Back took an interesting and accurate sketch of the view, to enable him to do which, we encamped early, having come twenty-one miles.

The Methye Portage is about twelve miles in extent, and over this space the canoes and all their cargoes are carried, both in going to and from the Athabasca department. It is part of the range of mountains which separates the waters flowing south from those flowing north. According to Sir Alexander Mac Kenzie, "this range of hills continues in a S.W. direction until its local height is lost between the Saskatchawan and Elk Rivers, close on the banks of the former, in latitude 53° 36′ N., longitude 113° 45′ W., when it appears to take its course due north." Observations, taken in the spring by Mr. Hood, place the north side of the portage in latitude 56° 41′ 40″ N., longitude 109° 52′ 15″ W., variation 25° 2′ 30″ E., dip 85° 7′ 27″.

At daylight on the 14th we began to descend the range of hills leading towards the river, and no small care was required to prevent the sledges from being broken in going down these almost perpendicular heights, or being precipitated into the glens on each side. As a precautionary measure the dogs were taken off, and the sledges guided by the men, notwithstanding which they descended with amazing rapidity, and the men were thrown into the most ridiculous attitudes in endeavouring to stop them. When we had arrived at the bottom I could not but feel astonished at the laborious task which the voyagers have twice in the year to encounter at this place, in conveying their stores backwards and forwards. We went across the Clear Water River, which runs at the bases of these

hills, and followed an Indian track along its northern bank, by which we avoided the White Mud and Good Portages. We afterwards followed the river as far as the Pine Portage, when we passed through a very romantic defile of rocks, which presented the appearance of Gothic ruins, and their rude characters were happily contrasted with the softness of the snow, and the darker foliage of the pines which crowned their summits. We next crossed the Cascade Portage, which is the last on the way to the Athabasca Lake, and we soon afterwards came to some Indian tents, containing five families, belonging to the Chipewyan tribe. We smoked the calumet in the Chief's tent, whose name was the Thumb, and distributed some tobacco and a weak mixture of spirits and water among the men. They received this civility with much less grace than the Crees, and seemed to consider it a matter of course. There was an utter neglect of cleanliness, and a total want of comfort in their tents; and the poor creatures were miserably clothed. Mr. Frazer, who accompanied us from the Methye Lake, accounted for their being in this forlorn condition by explaining, that this band of Indians had recently destroyed every thing they possessed, as a token of their great grief for the loss of their relatives in the prevailing sickness. It appears that no article is spared by these unhappy men when a near relative dies; their clothes and tents are cut to pieces, their guns broken, and every other weapon rendered useless, if some person do not remove these articles from their sight, which is seldom done.—Mr. Back sketched one of the children. This delighted the father very much, who charged the boy to be very good now, since his picture had been drawn by a great Chief. We learned that they prize pictures very highly, and esteem any they can get, however badly executed, as efficient charms. They were unable to give us any information respecting the country beyond the Athabasca Lake, which is the boundary of their peregrinations to the northward. Having been apprized of our coming, they had prepared an encamp-

ment for us; but we had witnessed too many proofs of their importunity to expect that we could pass the night near them in any comfort, whilst either spirits, tobacco, or sugar, remained in our possession; and therefore preferred to go about two miles further along the river, and to encamp among a cluster of fine pine-trees, after a journey of sixteen miles.

On the morning of the 15th, in proceeding along the river, we perceived a strong smell of sulphur, and on the north shore found a quantity of it scattered, which seemed to have been deposited by some spring in the neighbourhood: it appeared very pure and good. We continued our course the whole day along the river, which is about four hundred yards wide, has some islands, and is confined between low land, extending from the bases of the mountains on each side. We put up at the end of thirteen miles, and were then joined by a Chipewyan, who came, as we supposed, to serve as our guide to Pierre au Calumet, but as none of the party could communicate with our new friend, otherwise than by signs, we waited patiently until the morning to see what he intended to do. The wind blew a gale during the night, and the snow fell heavily. The next day our guide led us to the Pembina River, which comes from the southward, where we found traces of Indians, who appeared to have quitted this station the day before; we had, therefore, the benefit of a good track, which our dogs much required, as they were greatly fatigued, by having dragged their loads through very deep snow for the last two days. A moose deer crossed the river just before the party: this animal is plentiful in the vicinity. We encamped in a pleasant well sheltered place, having travelled fourteen miles.

We had made but a short distance the following morning, when we came to some Indian lodges, which belonged to an old Chipewyan chief, named the Sun, and his family, consisting of five hunters, their wives, and children. They were delighted to see us, and when the object of our expedition had been explained to them, ex-

pressed themselves much interested in our progress; but they could give no particle of information respecting the countries beyond the Athabasca Lake. We smoked with them, and gave each person a glass of mixed spirits and some tobacco. We learned from a Canadian servant of the North-West Company, who was residing with them, that this family had lost numerous relatives, and that the destruction of property, which had been made after their deaths, was the only cause for the pitiable condition in which we saw them. He said the whole family were industrious hunters, and, therefore, were usually better provided with clothes, and other useful articles, than most of the Indians. We purchased from them a pair of snow-shoes, in exchange for some ammunition. The Chipewyans are celebrated for making them good and easy to walk in; we saw some here upwards of six feet long, and three broad: with these unwieldy clogs an active hunter, in the spring, when there is a crust on the surface of the snow, will run down a moose or red deer.

We made very slow progress after leaving this party, on account of the deep snow, but continued along the river until we reached its junction with the Athabasca, or Elk River. We obtained observations on an island, a little below the Forks, which gave, longitude 111° 8′ 42″ W., variation 24° 18′ 20″ E. Very little wood has been seen during this day's march. The western shore, near the Forks, is destitute of trees; it is composed of lofty perpendicular cliffs, which are now covered with snow. The eastern shore supports a few pines.

March 18.—Soon after our departure from the encampment we met two men, from the establishment at Pierre au Calumet, who gave us correct information of the situation and distance. Having the benefit of their track, we marched at a tolerably quick pace, and made twenty-two miles in the course of the day, though the weather was very disagreeable for travelling, being stormy, with constant snow. We kept along the river the whole time: its

breadth is about two miles. The islands appear better furnished with wood than its banks, the summits of which are almost bare. Soon after we had encamped our Indian guide rejoined us; he had remained behind yesterday, to accompany a friend on a hunting excursion, without consulting us. On his return this evening he made no endeavour to explain the reason of his absence, but sat down coolly, and began to prepare his supper. This behaviour made us sensible that little dependence is to be placed on the continuance of an Indian guide, when his inclination leads him away.

Early the next morning we sent forward the Indian and a Canadian, to apprize the gentleman in charge of Pierre au Calumet of our approach; and, after breakfast, the rest of the party proceeded along the river for the station, which we reached in the afternoon. Mr. John Stuart was in charge of the post, the senior partner of the North-West Company in the Athabasca department. Though he was quite ignorant until this morning of our being in the country, we found him prepared to receive us with great kindness, and ready to afford every information and assistance, agreeably to the desire conveyed in Mr. Simon M'Gillivray's circular letter. This gentleman has twice traversed this continent, and reached the Pacific by the Columbia River; he was, therefore, fully conversant with the different modes of travelling, and with the obstacles that may be expected in passing through unfrequented countries. His suggestions and advice were consequently very valuable to us. Not having been to the northward of the Great Slave Lake, he had no knowledge of that line of country, except what he had gained from the reports of Indians. He was of opinion, however, that positive information, on which our course of proceedings may safely be determined, may be procured from the Indians that frequent the north side of the lake, but not before the spring when they come to the forts. He recommended my writing to the partner in charge of that department, requesting him to collect all the intelligence he

could, and to provide guides and hunters from the tribe which is best acquainted with the country we proposed to travel through.

To our great regret, Mr. Stuart expressed much doubt as to our prevailing upon any experienced Canadian voyagers to accompany us to the sea, in consequence of their dread of the Esquimaux; who, he informed us, had already destroyed the crew of one canoe, which had been sent under Mr. Livingstone, to open a trading communication with those who reside near the mouth of the Mackenzie River; and he mentioned, that the same tribe had driven away the canoes under Mr. Clark's direction, going to them on a similar object, to which circumstance I have alluded in my remarks at Isle à la Crosse.

This was unpleasant information; but we were comforted by Mr. Stuart's assurance that himself and his partners would use every endeavour to remove their fears, as well as to promote our views in every other way; and he undertook, as a necessary part of our equipment in the spring, to prepare the bark and other materials for constructing at this post two canoes.

Mr. Stuart informed us that the residents at Fort Chipewyan, from the recent sickness of their Indian hunters, have been reduced to subsist entirely on the produce of their fishing-nets, which did not then yield more than a bare sufficiency for their support; and he kindly proposed to us to remain with him until the spring; but, as we were most desirous to gain all the information we could as early as possible, and Mr. Stuart assured us that the addition of three persons would not be materially felt in their large family at Chipewyan, we determined on proceeding thither, and fixed on the 22d for the day of our departure.

This house receives its name from the place where the stone is procured, of which many of the pipes used by the Canadians and Indians are made. It is a clayey limestone, impregnated with various shells. The house is built on the summit of a steep bank,

rising almost perpendicular to the height of one hundred and eighty feet, and from it an extensive prospect is commanded along this fine river, and over the extensive plains which stretch out several miles at the back of it—and are bounded by hills of considerable height, which seem to be better furnished with wood than the neighbourhood of the fort, where the trees grow very scantily. There had been an establishment belonging to the Hudson's Bay Company on the opposite bank of the river, but it was abandoned in December last, on account of the residents not being able to procure provision from their hunters, having been disabled by the epidemic sickness, which has carried off one-third of the Indians in these parts. They belong to the Northern Crees, a name given them from their residing in the Athabasca department. There are now but few families of these men, who, formerly, by their numbers and predatory habits, spread terror among the natives of this part of the country.

There are springs of bituminous matter on several of the islands near to these houses; and the stones on the river-bank are much impregnated with this useful substance. There is also another remarkable place at which salt may be procured, which is deposited on the surface of a round backed hill about half a mile from the beach, and on the marshy ground underneath it, which is carried down from the reservoir by several small streams. We visited these places at a subsequent period of the journey, and descriptions of them will appear in Dr. Richardson's Mineralogical Notices.

The latitude of the North-West Company's House is 57° 24′ 06″ N., but this was the only observation we could obtain, owing to the atmosphere being cloudy during our stay. Mr. Stuart had an excellent thermometer, which indicated the lowest state of temperature to be 43° below zero. He told me 45° is the lowest temperature he had ever witnessed at the Athabasca or Great Slave Lake, after many years' residence. On the 21st it rose above zero, and at noon attained the height of 43°; the atmosphere was sultry,

snow fell constantly, and there was quite an appearance of a change in the season. On the 22d we parted from our hospitable friend, and re-commenced our journey, but under the expectation of seeing him again in May; at which time the partners of the Company usually assemble at Fort Chipewyan, when we hope the necessary arrangements for our future proceedings will be completed. We encamped at sunset, at the end of fourteen miles, having walked the whole way along the river, which preserves nearly a true north course, and is from four hundred to six hundred yards broad. The banks are high, and well furnished with the liard, spruce, fir, alder, birch-tree, and willows. Having come nineteen miles and a half, on the 23d, we encamped among pines of a great height and girth.

Showers of snow fell until noon on the following day, but we continued our journey along the river, whose banks and islands became gradually lower as we advanced, and less abundantly supplied with wood, except willows. We came up with an old Canadian, who was resting his wearied dogs during the heat of the sun. He was carrying meat from some Indian lodges to Fort Chipewyan, having a burden exceeding two hundred and fifty pounds on his sledge, which was dragged by two miserable dogs. He came up to our encampment after dark. We were much amused by the altercation that took place between him and our Canadian companions as to the qualifications of their respective dogs. This, however, is such a general topic of conversation among the voyagers in the encampment, that we should not probably have remarked it, had not the old man frequently offered to bet the whole of his wages that his two dogs, poor and lean as they were, would drag their load to the Athabasca Lake in less time than any three of theirs could. Having expressed our surprise at his apparent temerity, he coolly said the men from the lower countries did not understand the management of their dogs, and that he depended on his superior skill in driving; and we soon gathered from his remarks, that the voyagers of the Athabasca

department consider themselves as very superior to any other. The only reasons which he could assign were, that they had borne their burdens across the terrible Methye Portage, and that they were accustomed to live harder and more precariously.

March 25.—Having now the guidance of the old Canadian, we sent forward the Indian, and one of our men, with letters to the gentleman at the Athabasca lake. The rest of the party set off afterwards, and kept along the river until ten, when we branched off by portages into the Embarras River, the usual channel of communication in canoes with the lake. It is a narrow and serpentine stream, confined between alluvial banks which support pines, poplars, and willows. We had not advanced far before we came up with the two men despatched by us this morning. The stormy weather had compelled them to encamp, as there was too much drifting of the snow for any attempt being made to cross the lake. We were obliged, though most reluctantly, to follow their example; but we comforted ourselves with the reflection that this was the first time we had been stopped by the weather during our long journey, which was so near at an end. The gale afterwards increased, the squalls at night became very violent, disburthened the trees of the snow, and gave us the benefit of a continual fall of patches from them, in addition to the constant shower. We therefore quickly despatched our suppers, and retired under the shelter of our blankets.

March 26.—The boisterous weather continued through the night, and it was not before six this morning, that the wind became apparently moderate and the snow ceased. Two of the Canadians were immediately sent off with letters to the gentlemen at Fort Chipewyan. After breakfast we also started, but our Indian friend, having a great indisposition to move in such weather, remained by the fire. We soon quitted the river, and after crossing a portage, a small lake, and a point of land, came to the borders of the Mam-ma-wee Lake. We then found our error as to the strength of the wind; and that the

gale still blew violently, and there was so much drifting of the snow as to cover the distant objects by which our course could be directed. We fortunately got a glimpse through this cloud of a cluster of islands in the direction of the houses, and decided on walking towards them; but in doing this we suffered very much from the cold, and were obliged to halt under the shelter of them, and await the arrival of our Indian guide. He conducted us between these islands, over a small lake, and by a swampy river, into the Athabasca Lake, from whence the establishments were visible. At four P.M. we had the pleasure of arriving at Fort Chipewyan, and of being received by Messrs. Keith and Black, the partners of the North-West Company in charge, in the most kind and hospitable manner. Thus has terminated a winter's journey of eight hundred and fifty-seven miles, in the progress of which there has been a great intermixture of agreeable and disagreeable circumstances. Could the amount of each be balanced, I suspect the latter would much preponderate; and amongst these the initiation into the practice of walking in snow-shoes must be considered as prominent. The suffering it occasions can be but faintly imagined by a person who thinks upon the inconvenience of marching with a weight of between two and three pounds constantly attached to galled feet, and swelled ancles. Perseverance and practice only will enable the novice to surmount this pain.

The next evil is the being constantly exposed to witness the wanton and unnecessary cruelty of the men to their dogs, especially those of the Canadians, who beat them unmercifully, and habitually vent on them the most dreadful and disgusting imprecations. There are other inconveniences which though keenly felt during the day's journey are speedily forgotten, when stretched out in the encampment before a large fire, you enjoy the social mirth of your companions, who usually pass the evening in recounting their former feats in travelling. At this time the Canadians are always cheerful

and merry, and the only bar to their comfort arises from the frequent interruption occasioned by the dogs, who are constantly prowling about the circle, and snatching at every kind of food that happens to be within their reach. These useful animals are a comfort to them afterwards, by the warmth they impart when lying down by their side or feet, as they usually do. But the greatest gratifications a traveller in these regions enjoys, are derived from the hospitable welcome he receives at every trading post, however poor the means of the host may be; and from being disrobed even for a short time of the trappings of a voyager, and experiencing the pleasures of cleanliness.

The following are the estimated distances, in statute miles, which Mr. Back and I have travelled since our departure from Cumberland:

From Cumberland House to Carlton House . . .	263
From Carlton to Isle à la Crosse	230
From Isle à la Crosse to north side of the Methye Portage	124
From the Methye Portage to Fort Chipewyan . . .	240
	857 Miles.

CHAPTER IV.

Transactions at Fort Chipewyan—Arrival of Dr. Richardson and Mr. Hood—Preparations for our Journey to the Northward.

1820. March 26. ON the day after our arrival at Fort Chipewyan we called upon Mr. Mac Donald, the gentleman in charge of the Hudson's Bay Establishment called Fort Wedderburne, and delivered to him Governor Williams's circular letter, which desired that every assistance should be given to further our progress, and a statement of the requisitions which we should have to make on his post.

Our first object was to obtain some certain information respecting our future route; and accordingly we received from one of the North-West Company's interpreters, named Beaulieu, a half-breed, who had been brought up amongst the Dog-ribbed and Copper-Indians, some satisfactory information, which we afterwards found tolerably correct, respecting the mode of reaching the Copper-mine River, which he had descended a considerable way, as well as of the course of that river to its mouth. The Copper Indians, however, he said, would be able to give us more accurate information as to the latter part of its course, as they occasionally pursue it to the sea. He sketched on the floor a representation of the river, and a line of coast according to his idea of it. Just as he had finished, an old Chipewyan Indian, named Black Meat, unexpectedly came in, and instantly recognised the plan. He then took the charcoal from

Beaulieu, and inserted a track along the sea-coast, which he had followed in returning from a war excursion, made by his tribe against the Esquimaux. He detailed several particulars of the coast and the sea, which he represented as studded with well-wooded islands, and free from ice, close to the shore, but not to a great distance, in the month of July. He described two other rivers to the eastward of the Copper-mine River, which also fall into the Northern Ocean. The Anatessy, which issues from the Contway-to or Rum Lake, and the Thlouëea-tessy or Fish River, which rises near the eastern boundary of the Great Slave Lake; but he represented them both as being shallow, and too much interrupted by barriers for being navigated in any other than small Indian canoes.

Having received this satisfactory intelligence, I wrote immediately to Mr. Smith, of the North-West Company, and Mr. M'Vicar, of the Hudson's Bay Company, the gentlemen in charge of the posts at the Great Slave Lake, to communicate the object of the Expedition, and our proposed route; and to solicit any information they possessed, or could collect, from the Indians, relative to the countries we had to pass through, and the best manner of proceeding. As the Copper Indians frequent the establishment on the north side of the lake, I particularly requested them to explain to that tribe the object of our visit, and to endeavour to procure from them some guides and hunters to accompany our party. Two Canadians were sent by Mr. Keith with these letters.

The month of April commenced with fine and clear but extremely cold weather; unfortunately we were still without a thermometer, and could not ascertain the degrees of temperature. The coruscations of the Aurora were very brilliant almost every evening of the first week, and were generally of the most variable kind. On the 3d, they were particularly changeable. The first appearance exhibited three illuminated beams issuing from the horizon in the north, east, and west points, and directed towards the zenith; in a few

seconds these disappeared, and a complete circle was displayed, bounding the horizon at an elevation of fifteen degrees. There was a quick lateral motion in the attenuated beams of which this zone was composed. Its colour was a pale yellow, with an occasional tinge of red.

On the 8th of April the Indians saw some geese in the vicinity of this lake, but none of the migratory birds appeared near to the houses before the 15th, when some swans flew over. These are generally the first that arrive; the weather had been very stormy for the four preceding days, and this in all probability kept the birds from venturing farther north than where the Indians had first seen them.

In the middle of the month the snow began to waste daily, and by degrees it disappeared from the hills and the surface of the lake. On the 17th and 19th the Aurora appeared very brilliant in patches of light, bearing N.W. An old Cree Indian having found a beaver lodge near to the fort, Mr. Keith, Back, and I, accompanied him to see the method of breaking into it, and their mode of taking those interesting animals. The lodge was constructed on the side of a rock in a small lake, having the entrance into it beneath the ice. The frames were formed of layers of sticks, the interstices being filled with mud, and the outside was plastered with earth and stones, which the frost had so completely consolidated, that to break through required great labour, with the aid of the ice chisel, and the other iron instruments which the beaver hunters use. The chase, however, was unsuccessful, as the beaver had previously evacuated the lodge.

The first geese we observed flying near to the fort were seen on the 21st, and some were brought to the house on the 30th, but they were very lean; on the 25th flies were seen sporting in the sun, and on the 26th the ice on the lake, near the channel of the river, was overflowed, in consequence of the Athabasca river having

broken, up; but except where this water spread, there was no appearance of decay in the ice.

May.—During the first part of this month, the wind blew from the N.W., and the sky was cloudy. It generally thawed during the day, but froze through the night. On the 2nd the Aurora faintly gleamed through very dense clouds.

We had a long conversation with Mr. Dease of the North-West Company, who had recently arrived from his station at the bottom of the Athabasca Lake. This gentleman, having passed several winters on the Mackenzie's River, and at the posts to the northward of Slave Lake, possessed considerable information respecting the Indians, and those parts of the country to which our inquiries were directed, which he very promptly and kindly communicated. During our conversation, an old Chipewyan Indian, named the Rabbit's Head, entered the room, to whom Mr. Dease referred for information on some point. We found from his answer that he was a step son of the late Chief Matonnabee, who had accompanied Mr. Hearne on his journey to the sea, and that he had himself been of the party, but being then a mere boy, he had forgotten many of the circumstances. He confirms, however, the leading incidents related by Hearne, and was positive he reached the sea, though he admitted that none of the party had tasted the water. He represented himself to be the only survivor of that party. As he was esteemed a good Indian, I presented him with a medal, which he received gratefully, and concluded a long speech upon the occasion, by assuring me he should preserve it carefully all his life. The old man afterwards became more communicative, and unsolicited began to relate the tradition of his tribe, respecting the discovery of the Copper Mine, which we thought amusing; and as the subject is somewhat connected with our future researches, I will insert the translation of it which was given at the time by Mr. Dease, though a slight mention of it has been made by Hearne.

"The Chipewyans suppose the Esquimaux originally inhabited some land to the northward which is separated by the sea from this country; and that in the earliest ages of the world a party of these men came over, and stole a woman from their tribe, whom they carried to this distant country and kept in a state of slavery. She was very unhappy in her situation, and effected her escape after many years' residence among them. The forlorn creature wandered about, for some days, in a state of uncertainty what direction to take, when she chanced to fall upon a beaten path, which she followed, and was led to the sea. At the sight of the ocean her hope of being able to return to her native country vanished, and she sat herself down in despair, and wept. A wolf now advanced to caress her, and having licked the tears from her eyes, walked into the water, and she perceived with joy that it did not reach up to the body of the animal; emboldened by this appearance, she instantly arose, having determined on venturing after the wolf, and she immediately provided two sticks to support herself. The first and second nights she proceeded on, without finding any increase in the depth of the water, and when fatigued, rested herself on the sticks, whose upper ends she fastened together for the purpose. She was alarmed on the third morning, by arriving at a deeper part, but she resolved on going forward at any risk, rather than return; and her daring perseverance was crowned with success, by her attaining her native shore on the fifth day. She fortunately came to a part where there was a beaten path, which she knew to be the track made by the reindeer in their migrations. Here she halted, and prepared some sort of weapon for killing them; as soon as this was completed, she had the gratification to behold several herds of them advancing along the road, and had the happiness of killing a sufficient number for her winter's subsistence, which she determined to pass at that place, and therefore formed a house for herself, after the manner she had learned from the Esquimaux. When spring came, and she emerged

from her subterraneous dwelling, (for such the Chipewyans suppose it to have been,) she was astonished by observing a luminous glittering appearance on a distant hill, which she knew was not produced by the reflection of the sun, and being at a loss to assign any other cause for it, she resolved on going up to the shining object, and then found the hill was entirely composed of metal. She broke off several pieces, and perceiving that it yielded so readily to her beating, it occurred to her this copper (for that was the metal,) would be very serviceable to her countrymen, if she could find them again. While she was meditating on what was to be done, the thought struck her that it would be advisable to attach as many pieces of copper to her dress as she could, and then proceed into the interior, in search of some inhabitants, who, she supposed, would give her a favourable reception, on account of the valuable treasure she had brought.

"It happened that she met her own relations, and the young men, elated with the account she had given of the hill, made her instantly return with them; which she was enabled to do, having taken the precaution of putting up marks to indicate the path. The party reached the spot in safety, but the story had a melancholy catastrophe. These youths, overcome by excess of joy, gave loose to their unrestrained passions, and offered the grossest insults to their kind benefactress. She powerfully resisted them for some time, and when her strength was failing, she fled to the point of the mountain, as the only place of security. Immediately she had gained the summit, the earth opened, and ingulphed both herself and the mountain, to the utter dismay of the men, who were not more astonished at its sudden disappearance, than sorrowful for this just punishment of their wickedness. Ever since this event, the copper has only been found in small detached pieces on the surface of the earth."

On the 10th of May we were gratified by the appearance of spring,

though the ice remained firm on the lake. The anemone (pulsatilla, pasque flower,) appeared this day in flower, the trees began to put forth their leaves, and the musquitoes visited the warm rooms. On the 17th and 18th there were frequent showers of rain, and much thunder and lightning. This moist weather caused the ice to waste so rapidly, that by the 24th it had entirely disappeared from the lake. The gentlemen belonging to both the Companies quickly arrived from the different posts in this department, bringing their winter's collection of furs, which are forwarded from these establishments to the depôts.

I immediately waited on Mr. Colin Robertson, the agent of the Hudson's Bay Company, and communicated to him, as I had done before to the several partners of the North-West Company, our plan, and the requisitions we should have to make on each Company, and I requested of all the gentlemen the favour of their advice and suggestions. As I perceived that the arrangement of their winter accounts, and other business, fully occupied them, I forbore further pressing the subject of our concerns for some days, and until there was an appearance of despatching the first brigade of canoes. It then became necessary to urge their attention to them; but it was evident, from the determined commercial opposition, and the total want of intercourse between the two Companies, that we could not expect to receive any cordial advice, or the assurance of the aid of both, without devising some expedient to bring the parties together. I therefore caused a tent to be pitched at a distance from both establishments, and solicited the gentlemen of both Companies to meet Mr. Back and me there, for the purpose of affording us their combined assistance.

This request was immediately complied with; and on May 25th we were joined at the tent by Mr. Stuart and Mr. Grant, of the North-West Company, and Mr. Colin Robertson, of the Hudson's

Bay Company, all of whom kindly gave very satisfactory answers to a series of questions which we had drawn up for the occasion, and promised all the aid in their power.

Furnished with the information thus obtained, we proceeded to make some arrangements respecting the obtaining of men, and the stores we should require for their equipment, as well as for presents for the Indians; and on the following day a requisition was made on the Companies for eight men each, and whatever useful stores they could supply. We learnt with regret, that, in consequence of the recent lavish expenditure of their goods in support of the opposition, their supply to us would, of necessity, be very limited. The men, too, were backward in offering their services, especially those of the Hudson's Bay Company, who demanded a much higher rate of wages than I considered it would be proper to grant.

June 3.—Mr. Smith, a partner of the North-West Company, arrived from the Great Slave Lake, and was the bearer of the very gratifying intelligence that the principal Chief of the Copper Indians had received the communication of our arrival with joy, and given all the intelligence he possessed respecting the route to the sea-coast by the Copper-Mine River; and that he and a party of his men, at the instance of Mr. Wentzel, a clerk of the North-West Company, whom they wished might go along with them, had engaged to accompany the Expedition as guides and hunters. They were to await our arrival at Fort Providence, on the north side of the Slave Lake. Their information coincided with that given by Beaulieu. They had no doubt of our being able to obtain the means of subsistence in travelling to the coast. This agreeable intelligence had a happy effect upon the minds of the Canadian voyagers, many of their fears being removed: several of them seemed now disposed to volunteer; indeed, on the same evening, two men from the North-West Company offered themselves and were accepted.

June 5.—This day Mr. Back and I went over to Fort Wedder-

burne, to see Mr. Robertson respecting his quota of men. We learned from him that, notwithstanding his endeavours to persuade them, his most experienced voyagers still declined engaging without very exorbitant wages. After some hesitation, however, six men engaged with us, who were represented to be active and steady; and I got Mr. Robertson's permission for St. Germain, an interpreter belonging to this Company, to accompany us from Slave Lake, if he should choose. The bow-men and steers-men were to receive one thousand six hundred livres Halifax per annum, and the middle men one thousand two hundred, exclusive of their necessary equipments; and they stipulated that their wages should be continued until their arrival in Montreal, or their rejoining the service of their present employers.

I delivered to Mr. Robertson an official request, that the stores we had left at York Factory and the Rock Depôt, with some other supplies, might be forwarded to Slave Lake by the first brigade of canoes which should come in. He also took charge of my letters addressed to the Admiralty. Five men were afterwards engaged from the North-West Company for the same wages, and under the same stipulations, as the others, besides an interpreter for the Copper Indians; but this man required three thousand livres Halifax currency, which we were obliged to give him, as his services were indispensable.

The extreme scarcity of provision at the posts rendered it necessary to despatch all our men to the Mammawee Lake, where they might procure their own subsistence by fishing. The women and children were also sent away for the same purpose; and no other families were permitted to remain at the houses after the departure of the canoes, than those belonging to the men who were required to carry on the daily duty.

The large party of officers and men, which had assembled here from the different posts in the department, was again quickly dis-

persed. The first brigade of canoes, laden with furs, was despatched to the depôt on May 30th, and the others followed in two or three days afterwards. Mr. Stuart, the senior partner of the North-West Company, quitted us for the same destination, on June 4th; Mr. Robertson, for his depôt, on the next day; and on the 9th we parted with our friend Mr. Keith, to whose unremitting kindness we felt much indebted. I intrusted to his care a box containing some drawings by Mr. Back, the map of our route from Cumberland House, and the skin of a black beaver, (presented to the Expedition by Mr. Smith,) with my official letters, addressed to the Under Secretary of State. I wrote by each of these gentlemen to inform Dr. Richardson and Mr. Hood of the scarcity of stores at these posts, and to request them to procure all they possibly could on their route. Mr. Smith was left in charge of this post during the summer; this gentleman soon evinced his desire to further our progress, by directing a new canoe to be built for our use, which was commenced upon immediately.

June 21.—This day an opportunity offered of sending letters to the Great Slave Lake; and I availed myself of it, to request Mr. Wentzel would accompany the Expedition agreeably to the desire of the Copper Indians, communicating to him that I had received permission for him to do so from the partners of the North-West Company. Should he be disposed to comply with my invitation, I desired that he would go over to Fort Providence, and remain near the Indians whom he had engaged for our service. I feared lest they should become impatient at our unexpected delay, and, with the usual fickleness of the Indian character, remove from the establishment before we could arrive. It had been my intention to go to them myself, could the articles, with which they expected to be presented on my arrival, have been provided at these establishments; but as they could not be procured, I was compelled to defer my visit until our canoes should arrive. Mr. Smith sup-

posed that my appearance amongst them, without the means of satisfying any of their desires, would give them an unfavoúrable impression respecting the expedition, which would make them indifferent to exertion, if it did not even cause them to withdraw from their engagements.

The establishments at this place, Forts Chipewyan and Wedderburne, the chief posts of the companies in this department, are conveniently situated for communicating with the Slave and Peace Rivers, from whence the canoes assemble in the spring and autumn; on the first occasion they bring the collection of furs which has been made at the different outposts during the winter; and at the latter season they receive a supply of stores for the equipment of the Indians in their vicinity. Fort Wedderburne is a small house, which was constructed on Coal Island about five years ago, when the Hudson's Bay Company recommenced trading in this part of the country. Fort Chipewyan has been built many years, and is an establishment of very considerable extent, conspicuously situated on a rocky point of the northern shore; it has a tower which can be seen at a considerable distance. This addition was made about eight years ago, for the purpose of watching the motions of the Indians, who intended, as it was then reported, to destroy the house and all its inhabitants. They had been instigated to this rash design by the delusive stories of one among them, who had acquired great influence over his companions by his supposed skill in necromancy. This fellow had prophesied that there would soon be a complete change in the face of their country; that fertility and plenty would succeed to the present sterility; and that the present race of white inhabitants, unless they became subservient to the Indians, would be removed, and their place be filled by other traders, who would supply their wants in every possible manner. The poor deluded wretches, imagining they would hasten this happy change by destroying their present

traders, of whose submission there was no prospect, threatened to extirpate them. None of these menaces, however, were put in execution. They were probably deterred from the attempt by perceiving that a most vigilant guard was kept over them.

The portion of this extensive lake which is near to the establishments, is called "The Lake of the Hills" not improperly, as the northern shore and the islands are high and rocky. The south side, however, is quite level, consisting of alluvial land, subject to be flooded, lying betwixt the different mouths of the Elk River, and much intersected by water. The rocks on the northern shore are composed of syenite over which the soil is thinly spread; it is, however, sufficient to support a variety of firs and poplars, and many shrubs, lichens and mosses. The trees are now in full foliage, and the plants generally in flower, and the whole scene is quite enlivening. There can scarcely be a higher gratification than that which is enjoyed in this country in witnessing the rapid change which takes place in the course of a few days in the spring; scarcely does the snow disappear from the ground, before the trees are clothed with thick foliage, the shrubs open their leaves and put forth their variegated flowers, and the whole prospect becomes animating. The spaces between the rocky hills, being for the most part swampy, support willows and a few poplars. These spots are the favourite resort of the musquitoes, which incessantly torment the unfortunate persons who have to pass through them.

Some of the hills attain an elevation of five or six hundred feet, at the distance of a mile from the house; and from their summits a very picturesque view is commanded of the lake, and of the surrounding country. The land above the Great Point at the confluence of the main stream of the Elk River is six or seven hundred feet high, and stretches in a southern direction behind Pierre au Calumet. Opposite to that establishment, on the west side of the river, at some distance in the interior, the Bark Mountain rises and

ranges to the N.W., until it reaches Clear Lake, about thirty miles to the southward of the fort, and then goes to the south-westward, The Cree Indians generally procure from this range their provision, as well as the bark for the making of the canoes. There is another range of hills on the south shore, which runs towards the Peace River.

The residents of these establishments depend for subsistence almost entirely on the fish which this lake affords; they are usually caught in sufficient abundance throughout the winter, though at the distance of eighteen miles from the houses; on the thawing of the ice, the fish remove into some smaller lakes, and the rivers on the south shore. Though they are nearer to the forts than in winter, it frequently happens that high winds prevent the canoes from transporting them thither, and the residents are kept in consequence without a supply of food for two or three days together. The fish caught in the net are the tittameg, trout, carp, methye, and pike.

The traders here also get supplied by the hunters with buffalo and moose deer meat (which animals are found at some distance from the forts), but the greater part of it is either in a dried state, or pounded ready for making pemmican; and is required for the men whom they keep travelling during the winter to collect the furs from the Indians, and for the crews of the canoes on their outward passage to the depôts in spring. There was a great want of provision this season, and both the companies had much difficulty to provide a bare sufficiency, for the use of their different brigades of canoes. Mr. Smith assured me he had only five hundred pounds of meat remaining after the canoes had been despatched for the use of the men who might travel from the post during the summer, and that five years preceding, there had been thirty thousand pounds in store under similar circumstances. He ascribed this amazing difference more to the indolent habits which the Indians had acquired since the com-

mercial struggle commenced, than to their recent sickness, mentioning in confirmation of his opinion that they could now, by the produce of little exertion, obtain whatever they demanded from either establishment.

At the opening of the water in spring, the Indians resort to the establishments to settle their accounts with the traders, and to procure the necessaries they require for the summer. This meeting is generally a scene of much riot and confusion, for the hunters receive such quantities of spirits as to keep them in a state of intoxication for several days. This spring, however, owing to the great deficiency of spirits, we had the gratification of seeing them generally sober. They belong to the great family of the Chipewyan, or Northern, Indians, dialects of their language being spoken in the Peace, and M'Kenzie's Rivers, and by the populous tribes in New Caledonia, as ascertained by Sir Alexander M'Kenzie in his journey to the Pacific. They style themselves generally *Dinneh* men, or Indians, but each tribe, or horde, adds some distinctive epithet taken from the name of the river, or lake, on which they hunt, or the district from which they last migrated. Those who come to Fort Chipewyan term themselves Saw-eessaw-dinneh, (Indians from the rising sun, or Eastern Indians,) their original hunting grounds being between the Athabasca, and Great Slave Lakes, and Churchill River. This district, more particularly termed the Chipewyan lands, or *barren country*, is frequented by numerous herds of rein-deer, which furnish easy subsistence, and clothing to the Indians; but the traders endeavour to keep them in the parts to the westward where the beavers resort. There are about one hundred and sixty hunters who carry their furs to the Great Slave Lake, forty to Hay River, and two hundred and forty to fort Chipewyan. A few Northern Indians also resort to the posts at the bottom of the Lake of the Hills, on Red Deer Lake, and to Churchill. The distance, however, of the latter post from their hunting grounds, and the sufferings to which they are

exposed in going thither from want of food, have induced those who were formerly accustomed to visit it, to convey their furs to some nearer station.

These people are so minutely described by Hearne and M'Kenzie, that little can be added by a passing stranger, whose observations were made during short interviews, and when they were at the forts, where they lay aside many of their distinguishing characteristics, and strive at an imitation of the manners of the voyagers and traders.

The Chipewyans are by no means prepossessing in their appearance; they have broad faces, projecting cheek-bones and wide nostrils; but they have generally good teeth, and fine eyes. When at the fort they imitate the dress of the Canadians, except that, instead of trowsers, they prefer the Indian stockings, which only reach from the thigh to the ancle, and in place of the waistband they have a piece of cloth round the middle which hangs down loosely before and behind. Their hunting dress consists of a leathern shirt and stockings, over which a blanket is thrown, the head being covered with a fur cap or band. Their manner is reserved, and their habits are selfish; they beg with unceasing importunity for every thing they see. I never saw men who either received or bestowed a gift with such bad grace; they almost snatch the thing from you in the one instance, and throw it at you in the other. It could not be expected that such men should display in their tents, the amiable hospitality which prevails generally amongst the Indians of this country. A stranger may go away hungry from their lodges, unless he possesses sufficient impudence to thrust, uninvited, his knife into the kettle, and help himself. The owner, indeed, never deigns to take any notice of such an act of rudeness, except by a frown, it being beneath the dignity of a hunter, to make disturbance about a piece of meat.

As some relief to the darker shades of their character it should

be stated that instances of theft are extremely rare amongst them. They profess strong affection for their children, and some regard for their relations, who are often numerous, as they trace very far the ties of consanguinity. A curious instance of the former was mentioned to us, and so well authenticated, that I shall venture to give it in the words of Dr. Richardson's Journal.

"A young Chipewyan had separated from the rest of his band for the purpose of trenching beaver, when his wife who was his sole companion, and in her first pregnancy, was seized with the pains of labour. She died on the third day after she had given birth to a boy. The husband was inconsolable, and vowed in his anguish never to take another woman to wife, but his grief was soon in some degree absorbed in anxiety for the fate of his infant son. To preserve its life he descended to the office of nurse, so degrading in the eyes of a Chipewyan, as partaking of the duties of a woman. He swaddled it in soft moss, fed it with broth made from the flesh of the deer, and to still its cries applied it to his breast, praying earnestly to the great Master of Life, to assist his endeavours. The force of the powerful passion by which he was actuated produced the same effect in his case, as it has done in some others which are recorded; a flow of milk actually took place from his breast. He succeeded in rearing his child, taught him to be a hunter, and when he attained the age of manhood, chose him a wife from the tribe. The old man kept his vow in never taking a second wife himself, but he delighted in tending his son's children, and when his daughter-in-law used to interfere, saying, that it was not the occupation of a man, he was wont to reply, that he had promised to the great Master of Life, if his child was spared, never to be proud, like the other Indians. He used to mention, too, as a certain proof of the approbation of Providence, that although he was always obliged to carry his child on his back while hunting, yet that it never roused a moose by its cries, being always particularly still at

those times. Our informant* added that he had often seen this Indian in his old age, and that his left breast, even then, retained the unusual size, it had acquired in his occupation of nurse."

We had proof of their sensibility towards their relations, in their declining to pitch their tents where they had been accustomed to do for many years, alleging a fear of being reminded of the happy hours they had formerly spent there, in the society of the affectionate relatives whom the sickness had recently carried off. The change of situation, however, had not the effect of relieving them from sorrowful impressions, and they occasionally indulged in very loud lamentations, as they sat in groups, within and without their tents. Unfortunately, the spreading of a severe dysentery amongst them, at this time, gave occasion for the renewal of their grief. The medicinal charms of drumming and singing were plentifully applied, and once they had recourse to conjuring over a sick person. I was informed, however, that the Northern Indians do not try this expedient for the cure of a patient so often as the Crees; but when they do, the conjuror is most assiduous, and suffers great personal fatigue. Particular persons only, are trained in the mysteries of the art of conjuring, to procure the recovery of the sick, or to disclose future events.

On extraordinary occasions the man remains in his narrow conjuring tent, for days without eating, before he can determine the matter to his satisfaction. When he is consulted about the sick, the patient is shut up with him; but on other occasions he is alone, and the poor creature often works his mind up to a pitch of illusion that can scarcely be imagined by one who has not witnessed it. His deluded companions seat themselves round his tent, and await his communication with earnest anxiety, yet during the progress of his manœuvres, they often venture to question him, as to the disposition of the Great Spirit.

* Mr. Wentzel.

These artful fellows usually gain complete ascendency over the minds of their companions. They are supported by voluntary contributions of provision, that their minds may not be diverted by the labour of hunting, from the peculiar duties of their profession.

The chiefs among the Chipewyans are now totally without power. The presents of a flag, and a gaudy dress, still bestowed upon them by the traders, do not procure for them any respect or obedience, except from the youths of their own families. This is to be attributed mainly to their living at peace with their neighbours, and to the facility which the young men find in getting their wants supplied independent of the recommendation of the chiefs, which was formerly required. In war excursions, boldness and intrepidity would still command respect and procure authority; but the influence thus acquired would, probably, cease with the occasion that called it forth. The traders, however, endeavour to support their authority by continuing towards them the accustomed marks of respect, hoisting the flag, and firing a salute of musketry on their entering the fort.

The chief halts at a distance from the house, and despatches one of his young men to announce his approach, and to bring his flag, which is carried before him when he arrives. The messenger also carries to him some vermilion to ornament the faces of his party, together with a looking-glass and comb, some tobacco, and a few rounds of ammunition, that they may return the salute. These men paint round the eyes, the forehead, and the cheek bones.

The Northern Indians evince no little vanity, by assuming to themselves the comprehensive title of "The People," whilst they designate all other nations by the name of their particular country. If men were seen at a distance, and a Chipewyan was asked who those persons were, he would answer, The People, if he recognised them to belong to his tribe, and never Chipewyans; but he would

give them their respective names, if they were Europeans, Canadians, or Cree Indians.

As they suppose their ancestors to come originally from the east, those who happen to be born in the eastern part of their territory, are considered to be of the best origin. I have been informed, that all the Indians who trade at the different posts in the north-west parts of America, imagine that their forefathers came from the east, except the Dog-ribs, who reside between the Copper Indian Lands and the Mackenzie's River, and who deduce their origin from the west, which is the more remarkable, as they speak a dialect of the Chipewyan language. I could gather no information respecting their religious opinions, except that they have a tradition of a deluge.

The Chipewyans are considered to be less expert hunters than the Crees, which probably arises from their residing much on the barren lands, where the rein-deer are so numerous that little skill is requisite. A good hunter, however, is highly esteemed among them. The facility of procuring goods, since the commercial opposition commenced, has given great encouragement to their native indolence of disposition, as is manifested by the difference in the amount of their collections of furs and provision between the late and former years. From six to eight hundred packs of furs used formerly to be sent from this department, now the return seldom exceeds half that amount. The decrease in the provision has been already mentioned.

The Northern Indians suppose that they originally sprang from a dog; and, about five years ago, a superstitious fanatic so strongly pressed upon their minds the impropriety of employing these animals, to which they were related, for purposes of labour, that they universally resolved against using them any more, and, strange as it may seem, destroyed them. They now have to drag every thing

themselves on sledges. This laborious task falls most heavily on the women; nothing can more shock the feelings of a person, accustomed to civilized life, than to witness the state of their degradation. When a party is on a march the women have to drag the tent, the meat, and whatever the hunter possesses, whilst he only carries his gun and medicine case. In the evening they form the encampment, cut wood, fetch water, and prepare the supper; and then, perhaps, are not permitted to partake of the fare until the men have finished. A successful hunter sometimes has two or three wives; whoever happens to be the favourite, assumes authority over the others, and has the management of the tent. These men usually treat their wives unkindly, and even with harshness; except, indeed, at the time when they are about to increase the family, and then they shew them much indulgence.

Hearne charges the Chipewyans with the dreadful practice of abandoning, when in extremity, their aged and sick people. The only instance that came under our personal notice was attended with some palliating circumstances:—An old woman arrived at Fort Chipewyan, during our residence, with her son, a little boy about ten years old, both of whom had been deserted by their relations, and left in an encampment, when much reduced by sickness: two or three days after their departure the woman gained a little strength, and, with the assistance of the boy, was enabled to paddle a canoe to the fishing station of this post, where they were supported for some days, until they were enabled to proceed in search of some other relations, who, they expected, would treat them with more kindness. I learned, indeed, that the woman bore an extremely bad character, and had even been guilty of infanticide, and that her companions considered her offences merited the desertion.

This tribe, since its present intimate connexion with the traders, has discontinued its war excursions against the Esquimaux, but they still speak of that nation in terms of the most inveterate hatred.

We have only conversed with four men who have been engaged in any of those expeditions; all these confirm the statements of Blackmeat respecting the sea-coast. Our observations concerning the half-breed population in this vicinity, coincided so exactly with those which have been given of similar persons in Dr. Richardson's account of the Crees, that any statement respecting them at this place is rendered unnecessary. Both the Companies have wisely prohibited their servants from intermarrying with pure Indian women, which was formerly the cause of many quarrels with the tribes.

The weather was extremely variable, during the month of June; we scarcely had two clear days in succession, and the showers of rain were frequent; the winds were often strong, and generally blowing from the north-east quarter. On the evening of the 16th the Aurora Borealis was visible, but after that date the nights were too light for our discerning it.

The musquitoes swarmed in great numbers about the house, and tormented us so incessantly by their irritating stings, that we were compelled to keep our rooms constantly filled with smoke, which is the only means of driving them away: the weather indeed was now warm. Having received one of Dollond's eighteen-inch spirit thermometers from Mr. Stuart, which he had the kindness to send us from his post at Pierre au Calumet, after he had learned that ours had been rendered useless, I observed the temperature, at noon, on the 25th of June, to be 63°.

On the following morning we made an excursion, accompanied by Mr. Smith, round the fishing stations on the south side of the lake, for the purpose of visiting our men: we passed several groups of women and children belonging to both the forts, posted wherever they could find a sufficiently dry spot for an encampment. At length we came to our men, pitched upon a narrow strip of land, situated between two rivers. Though the portion of dry ground

did not exceed fifty yards, yet they appeared to be living very comfortably, having formed huts with the canoes' sail and covering, and were amply supported by the fish their nets daily furnished. They sometimes had a change in their fare, by procuring a few ducks and other water fowl, which resort in great abundance to the marshes, by which they were surrounded.

July 2.—The canoe, which was ordered to be built for our use, was finished. As it was constructed after the manner, which has been accurately described by Hearne, and several of the American travellers, a detail of the process will be unnecessary. Its extreme length was thirty-two feet six inches, including the bow and stern pieces, its greatest breadth was four feet ten inches, but it was only two feet nine inches forward where the bowman sat, and two feet four inches behind where the steersman was placed; and its depth was one foot eleven and a quarter inches. There were seventy-three hoops of thin cedar, and a layer of slender laths of the same wood within the frame. These feeble vessels of bark will carry twenty-five pieces of goods, each weighing ninety pounds, exclusive of the necessary provision and baggage for the crew of five or six men, amounting in the whole to about three thousand three hundred pounds' weight. This great lading they annually carry between the depôts and the posts, in the interior; and it rarely happens that any accidents occur, if they are managed by experienced bowmen and steersmen, on whose skill the safety of the canoe entirely depends in the rapids and difficult places. When a total portage is made, these two men carry the canoe, and they often run with it, though its weight is estimated at about three hundred pounds, exclusive of the poles and oars, which are occasionally left in where the distance is short.

On the 5th, we made an excursion for the purpose of trying our canoe. A heavy gale came on in the evening, which caused a great swell in the lake, and in crossing these waves we had the satisfaction to find that our birchen vessel proved an excellent sea boat.

July 7.—This morning some men, and their families, who had been sent off to search for Indians, with whom they intended to pass the summer, returned to the fort in consequence of a serious accident having befallen their canoe in the Red Deer River: when they were in the act of hauling up a strong rapid, the line broke, the canoe was overturned, and two of the party narrowly escaped drowning; fortunately the women and children happened to be on shore, or, in all probability, they would have perished in the confusion of the scene. Nearly all their stores, their guns, and fishing-nets, were lost, and they could not procure any other food for the last four days than some unripe berries.

Some gentlemen arrived in the evening with a party of Chipewyan Indians, from Hay River, a post between the Peace River, and the Great Slave Lake. These men gave distressing accounts of sickness among their relatives, and the Indians in general along the Peace River, and they say many of them have died. The disease is said to be dysentery. On the 10th and 11th we had very sultry weather, and were dreadfully tormented by musquitoes. The highest temperature was 73°.

July 13.—This morning Mr. Back and I had the sincere gratification of welcoming our long-separated friends, Dr. Richardson and Mr. Hood, who arrived in perfect health with two canoes, having made a very expeditious journey from Cumberland, notwithstanding they were detained near three days in consequence of the melancholy loss of one of their bowmen, by the upsetting of a canoe in a strong rapid; but, as the occurrences of this journey, together with the mention of some other circumstances that happened previous to their departure from Cumberland, which have been extracted from Mr. Hood's narrative, will appear in the following chapter, it will be unnecessary to enter farther into these points now.

The zeal and talent displayed by Dr. Richardson and Mr. Hood, in the discharge of their several duties, since my separation from

them, drew forth my highest approbation. These gentlemen had brought all the stores they could procure from the establishments at Cumberland and Isle à la Crosse; and at the latter place they had received ten bags of pemmican from the North-West Company, which proved to be mouldy, and so totally unfit for use that it was left at the Methye portage. They got none from the Hudson's Bay post. The voyagers belonging to that Company, being destitute of provision, had eaten what was intended for us. In consequence of these untoward circumstances, the canoes arrived with only one day's supply of this most essential article. The prospect of having to commence our journey from hence, almost destitute of provision, and scantily supplied with stores, was distressing to us, and very discouraging to the men. It was evident, however, that any unnecessary delay here would have been very imprudent, as Fort Chipewyan did not, at the present time, furnish the means of subsistence for so large a party, much less was there a prospect of our receiving any supply to carry with us. We, therefore, hastened to make the necessary arrangements for our speedy departure. All the stores were demanded that could possibly be spared from both the establishments; and we rejoiced to find, that when this collection was added to the articles that had been brought up by the canoes, that we had a sufficient quantity of clothing for the equipment of the men who had been engaged here, as well as to furnish a present to the Indians, besides some few goods for the winter's consumption; but we could not procure any ammunition, which was the most essential article, or spirits, and but little tobacco.

We then made a final arrangement respecting the voyagers, who were to accompany the party; and, fortunately, there was no difficulty in doing this, as Dr. Richardson and Mr. Hood had taken the very judicious precaution of bringing up ten men from Cumberland, who were engaged to proceed forward if their services were required. The Canadians, whom they brought, were most desirous of being

continued, and we felt sincere pleasure in being able to keep men who were so zealous in the cause, and who had given proofs of their activity on their recent passage to this place, by discharging those men who were less willing to undertake the journey; of these three were Englishmen, one American, and three Canadians. When the numbers were completed, which we had been recommended by the traders to take as a protection against the Esquimaux, we had sixteen Canadian-voyagers, and our worthy and only English attendant John Hepburn, besides the two interpreters whom we were to receive at the Great Slave Lake; we were also accompanied by a Chipewyan woman. An equipment of goods was given to each of the men who had been engaged at this place, similar to what had been furnished to the others at Cumberland; and when this distribution had been made, the remainder were made up into bales, preparatory to our departure, on the following day. We were cheerfully assisted in these and all our occupations by Mr. Smith, who evinced an anxious desire to supply our wants as far as his means permitted.

Mr. Hood having brought up the dipping needle from Cumberland House, we ascertained the dip to be 85° 23′ 42″, and the difference produced by reversing the face of the instrument was 6° 2′ 10″. The intensity of the magnetic force was also observed. Several observations had been procured on both sides of the moon during our residence at Fort Chipewyan, the result of which gave for its longitude 111° 18′ 20″ W., its latitude was observed to be 18° 42′ 38″ N., and the variation of the compass 22° 49′ 32″ E. Fresh rates were procured for the chronometers and their errors determined for Greenwich time, by which the survey to the northward was carried on.

CHAPTER V.

Mr. Hood's Journey to the Basquiau Hill—Sojourns with an Indian Party—His Journey to Chipewyan.

1820. March. BEING desirous of obtaining a drawing of a moose deer, and also of making some observations on the height of the Aurora, I set out on the 23rd, to pass a few days at the Basquiau Hill. Two men accompanied me, with dogs and sledges, who were going to the hill for meat. We found the Saskatchawan open, and were obliged to follow it several miles to the eastward. We did not, then, cross it without wading in water, which had overflowed the ice; and our snow shoes were encumbered with a heavy weight for the remainder of the day. On the south bank of the Saskatchawan were some poplars ten or twelve feet in circumference at the root. Beyond the river, we traversed an extensive swamp, bounded by woods. In the evening we crossed the Swan Lake, about six miles in breadth, and eight in length, and halted on its south side for the night, twenty-four miles S.S.W. of Cumberland House.

At four in the morning of the 24th we continued the journey, and crossed some creeks in the woods, and another large swamp. These swamps are covered with water in summer, to the depth of several feet, which arises from the melted snow from the higher grounds. The tracks of foxes, wolves, wolverenes, and martens, were very numerous. The people, employed in carrying meat, set traps on their way out, and take possession of their captures at their return,

for which they receive a sum from the Company, proportioned to the value of the fur.

In the evening we crossed the Goose Lake, which is a little longer than Swan Lake, and afterwards the River Sepanach, a branch of the Saskatchawan, forming an island extending thirty miles above, and forty below Cumberland House. We turned to the westward on the Root River, which enters the Sepanach, and halted on its banks, having made in direct distance not more than twenty miles since the 23rd.

We passed the Shoal Lake on the 25th, and then marched twelve miles through woods and swamps to a hunting tent of the Indians. It was situated in a grove of large poplars, and would have been no unpleasant residence if we could have avoided the smoke. A heavy gale from the westward, with snow, confined us for several days to this tent. On the 30th two Indians arrived, one of whom named the Warrior, was well known at the house. We endeavoured to prevail upon them to set out in quest of moose, which they agreed to do, on receiving some rum. Promises were of no avail; the smallest present gratification is preferred to the certainty of ample reward at another period; an unfailing indication of strong animal passions, and a weak understanding. On complying with their demand they departed.

The next day, I went to the Warrior's tent, distant about eleven miles. The country was materially changed: the pine had disappeared, and gentle slopes, with clumps of large poplars, formed some pleasing groups; willows were scattered over the swamps. When I entered the tent, the Indians spread a buffalo robe before the fire, and desired me to sit down. Some were eating, others sleeping, many of them without any covering except the breach cloth and a blanket over the shoulders; a state in which they love to indulge themselves till hunger drives them forth to the chase. Besides the Warrior's family, there was that of another hunter named *Long-legs*,

Drawn by Lieut Hood R N

Engraved by Edwd Lindon

INTERIOR OF A CREE INDIAN TENT.

March 25th 1820.

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whose bad success in hunting, had reduced him to the necessity of feeding on moose leather for three weeks, when he was compassionately relieved by the Warrior. I was an unwilling witness of the preparation of my dinner by the Indian women. They cut into pieces a portion of fat meat, using for that purpose a knife and their teeth. It was boiled in a kettle, and served in a platter made of birch bark, from which, being dirty, they had peeled the surface. However, the flavour of good moose meat will survive any process that it undergoes in their hands, except smoking.

Having provided myself with some drawing materials, I amused the Indians with a sketch of the interior of the tent and its inhabitants. An old woman, who was relating with great volubility an account of some quarrel with the traders at Cumberland House, broke off from her narration when she perceived my design; supposing, perhaps, that I was employing some charm against her; for the Indians have been taught a supernatural dread of particular pictures. One of the young men drew, with a piece of charcoal, a figure resembling a frog, on the side of the tent, and by significantly pointing at me, excited peals of merriment from his companions. The caricature was comic; but I soon fixed their attention, by producing my pocket compass, and affecting it with a knife. They have great curiosity, which might easily be directed to the attainment of useful knowledge. As the dirt accumulated about these people was visibly of a communicative nature, I removed at night into the open air, where the thermometer fell to 15° below zero, although it was the next day 60° above it.

In the morning the Warrior and his companion arrived; I found that, instead of hunting, they had passed the whole time in a drunken fit, at a short distance from the tent. In reply to our angry questions, the Warrior held out an empty vessel, as if to demand the payment of a debt, before he entered into any new negotiation. Not being inclined to starve his family, we set out for

another Indian tent, ten miles to the southward, but we found only the frame, or tent poles, standing, when we reached the spot. The men, by digging where the fire-place had been, ascertained that the Indians had quitted it the day before; and as their marches are short, when encumbered with the women and baggage, we sought out their track, and followed it. At an abrupt angle of it, which was obscured by trees, the men suddenly disappeared; and, hastening forward to discover the cause, I perceived them both still rolling at the foot of a steep cliff, over which they had been dragged, while endeavouring to stop the descent of their sledges. The dogs were gazing silently, with the wreck of their harness about them, and the sledges deeply buried in the snow. The effects of this accident did not detain us long, and we proceeded afterwards with greater caution.

The air was warm at noon, and the solitary but sweet notes of the jay, the earliest spring bird, were in every wood. Late in the evening we descried the ravens wheeling in circles round a small grove of poplars, and, according to our expectations, found the Indians encamped there. The men were absent hunting, and returned unsuccessful. They had been several days without provisions, and thinking that I could depend upon the continuance of their exertions, I gave them a little rum; the next day they set out, and at midnight they swept by us with their dogs in close pursuit.

In the morning we found that a moose had eaten the bark of a tree near our fire. The hunters, however, again failed; and they attributed the extreme difficulty of approaching the chase, to the calmness of the weather, which enabled it to hear them at a great distance.

They concluded, as usual, when labouring under any affliction, that they were tormented by the evil spirit; and assembled to beat a large tambourine, and sing an address to the manito, or deity, praying for relief, according to the explanation which I received:

but their prayer consisted of only three words, constantly repeated. One of the hunters yet remained abroad; and as the wind rose at noon, we had hopes that he was successful. In the evening he made his appearance, and announcing that he had killed a large moose, immediately secured the reward which had been promised.

The tidings were received with apparent indifference, by people whose lives are alternate changes from the extremity of want to abundance. But as their countenances seldom betray their emotions, it cannot be determined whether their apathy is real or affected. However, the women prepared their sledges and dogs, with the design of dismembering, and bringing home, the carcass; a proceeding to which, in their necessitous condition, I could have had neither reasonable nor available objections, without giving them a substitute. By much solicitation I obtained an audience, and offered them our own provisions, on condition of their suspending the work of destruction till the next day. They agreed to the proposition, and we set out with some Indians for the place where the animal was lying. The night advancing, we were separated by a snow-storm, and not being skilful enough to follow tracks which were so speedily filled up, I was bewildered for several hours in the woods, when I met with an Indian, who led me back at such a pace that I was always in the rear, to his infinite diversion. The Indians are vain of their local knowledge, which is certainly very wonderful. Our companions had taken out the entrails and young of the moose, which they buried in the snow.

The Indians then returned to the tents, and one of my men accompanied them; he was the person charged with the management of the trade at the hunting tent; and he observed, that the opportunity of making a bargain with the Indians, while they were drinking, was too advantageous to be lost.

It remained for us to prevent the wolves from mangling the moose; for which purpose we wrapped ourselves in blankets between

its feet, and placed the hatchets within our reach. The night was stormy, and apprehension kept me long awake; but finding my companion in so deep a sleep, that nothing could have roused him, except the actual gripe of a wolf, I thought it advisable to imitate his example, as much as was in my power, rather than bear the burthen of anxiety alone. At day-light we shook off the snow, which was heaped upon us, and endeavoured to kindle a fire; but the violence of the storm defeated all our attempts. At length two Indians arrived, with whose assistance we succeeded, and they took possession of it, to show their sense of our obligations to them. We were ashamed of the scene before us; the entrails of the moose and its young, which had been buried at our feet, bore testimony to the nocturnal revel of the wolves, during the time we had slept. This was a fresh subject of derision for the Indians, whose appetites, however, would not suffer them to waste long upon us a time so precious. They soon finished what the wolves had begun, and with as little aid from the art of cookery, eating both the young moose, and the contents of the paunch, raw.

I had scarcely secured myself by a lodge of branches from the snow, and placed the moose in a position for my sketch, when we were stormed by a troop of women and children, with their sledges and dogs. We obtained another short respite from the Indians, but our blows could not drive, nor their caresses entice, the hungry dogs from the tempting feast before them.

I had not finished my sketch, before the impatient crowd tore the moose to pieces, and loaded their sledges with meat. On our way to the tent, a black wolf rushed out upon an Indian, who happened to pass near its den. It was shot; and the Indians carried away three black whelps, to improve the breed of their dogs. I purchased one of them, intending to send it to England, but it perished for want of proper nourishment.

The latitude of these tents, was 53° 12′ 46″ N., and longitude

by chronometers 103° 13′ 10″ W. On the 5th of April we set out for the hunting tent by our former track, and arrived there in the evening.

As the increasing warmth of the weather had threatened to interrupt communication by removing the ice, orders had been sent from Cumberland House to the people at the tent, to quit it without delay; which we did on the 7th. Some altitudes of the Aurora were obtained, the results of which will be noticed elsewhere.

We had a fine view, at sun-rise, of the Basquiau Hill, skirting half the horizon with its white sides, chequered by forests of pine. It is seen from Pine Island Lake, at the distance of fifty miles; and cannot, therefore, be less than three-fourths of a mile in perpendicular height; probably the greatest elevation between the Atlantic Ocean, and the Rocky Mountains.

A small stream runs near the hunting tent, strongly impregnated with salt. There are several salt springs about it, which are not frozen during the winter.

The surface of the snow, thawing in the sun, and freezing at night, had become a strong crust, which sometimes gave way in a circle round our feet, immerging us in the soft snow beneath. The people were afflicted with snow blindness; a kind of ophthalmia occasioned by the reflection of the sun's rays in the spring.

The miseries endured during the first journey of this nature, are so great, that nothing could induce the sufferer to undertake a second, while under the influence of present pain. He feels his frame crushed by unaccountable pressure, he drags a galling and stubborn weight at his feet, and his track is marked with blood. The dazzling scene around him affords no rest to his eye, no object to divert his attention from his own agonizing sensations. When he rises from sleep, half his body seems dead, till quickened into feeling by the irritation of his sores. But, fortunately for him, no evil makes an impression so evanescent as pain. It cannot be wholly

banished, nor recalled with the force of reality, by any act of the mind, either to affect our determinations, or to sympathize with another. The traveller soon forgets his sufferings, and at every future journey, their recurrence is attended with diminished acuteness.

It was not before the 10th or 12th of April, that the return of the swans, geese, and ducks, gave certain indications of the advance of spring. The juice of the maple tree began to flow, and the women repaired to the woods for the purpose of collecting it. This tree which abounds to the southward, is not, I believe found to the northward of the Saskatchawan. The Indians obtain the sap by making incisions into the tree. They boil it down, and evaporate the water, skimming off the impurities. They are so fond of sweets, that after this simple process, they set an extravagant price upon it.

On the 15th fell the first shower of rain we had seen for six months, and on the 17th the thermometer rose to 77° in the shade. The whole face of the country was deluged by the melted snow. All the nameless heaps of dirt, accumulated in the winter, now floated over the very thresholds, and the long-imprisoned scents dilated into vapours so penetrating, that no retreat was any security from them. The flood descended into the cellar below our house, and destroyed a quantity of powder and tea; a loss irreparable in our situation.

The noise made by the frogs which this inundation produced, is almost incredible. There is strong reason to believe that they outlive the severity of winter. They have often been found frozen and revived by warmth, nor is it possible that the multitude which incessantly filled our ears with its discordant notes could have been matured in two or three days.

The fishermen at Beaver Lake, and the other detached parties were ordered to return to the post. The expedients to which the poor people were reduced, to cross a country so beset with waters, presented many uncouth spectacles. The inexperienced were glad

to compromise, with the loss of property, for the safety of their persons, and astride upon ill-balanced rafts with which they struggled to be uppermost, exhibited a ludicrous picture of distress. Happy were those who could patch up an old canoe, though obliged to bear it half the way on their shoulders, through miry bogs and interwoven willows. But the veteran trader, wedged in a box of skin, with his wife, children, dogs, and furs, wheeled triumphantly through the current, and deposited his heterogeneous cargo safely on the shore. The woods re-echoed with the return of their exiled tenants. An hundred tribes as gaily dressed as any burnished natives of the south, greeted our eyes in our accustomed walks, and their voices, though unmusical, were the sweetest that ever saluted our ears.

From the 19th to the 26th the snow once more blighted the resuscitating verdure, but a single day was sufficient to remove it. On the 28th the Saskatchawan swept away the ice which had adhered to its banks, and the next day a boat came down from Carlton House with provisions. We received such accounts of the state of vegetation at that place, that Dr. Richardson determined to visit it, in order to collect botanical specimens, as the period at which the ice was expected to admit of the continuation of our journey was still distant. Accordingly he embarked on the 1st of May.

In the course of the month the ice gradually wore away from the south side of the lake, but the great mass of it still hung to the north side with some snow visible on its surface. By the 21st the elevated grounds were perfectly dry, and teeming with the fragrant offspring of the season. When the snow melted, the earth was covered with the fallen leaves of the last year, and already it was green with the strawberry plant, and the bursting buds of the gooseberry, raspberry, and rose bushes, soon variegated by the rose and the blossoms of the choke cherry. The gifts of nature are disregarded and undervalued till they are withdrawn, and in the hideous regions of the Arctic Zone, she would make a convert of

him for whom the gardens of Europe had no charms, or the mild beauties of a southern clime had bloomed in vain.

Mr. Williams found a delightful occupation in his agricultural pursuits. The horses were brought to the plough, and fields of wheat, barley, and Indian corn, promised to reward his labours. His dairy furnished us with all the luxuries of an English farm.

On the 25th the ice departed from Pine Island Lake. We were, however, informed that Beaver Lake, which was likewise in our route, would not afford a passage before the 4th of June. According to directions left by Mr. Franklin, applications were made to the Chiefs of the Hudson's Bay and North-West Companies' posts, for two canoes, with their crews, and a supply of stores, for the use of the Expedition. They were not in a condition to comply with this request till the arrival of their respective returns from Isle à la Crosse and the Saskatchawan departments. Of the six men whom we brought from England, the most serviceable, John Hepburn, had accompanied Mr. Franklin, and only one other desired to prosecute the journey with us. Mr. Franklin had made arrangements with Mr. Williams for the employment of the remaining five men in bringing to Cumberland House the ammunition, tobacco, *&c.*, left at York Fort, which stores were, if possible, to be sent after us in the summer. On the 30th Dr. Richardson returned from Carlton House, and on the 31st the boats arrived belonging to the Hudson's Bay Company's Saskatchawan department. We obtained a canoe and two more volunteers. On the 1st of June the Saskatchawan, swelled by the melting of the snow near the rocky mountains, rose twelve feet, and the current of the little rivers bounding Pine Island ran back into the lake, which it filled with mud.

On the 5th the North-West Company's people arrived, and Mr. Conolly furnished us with a canoe and five Canadians. They were engaged to attend us till Mr. Franklin should think fit to discharge them, and bound under the usual penalties in case of disobedience, or

other improper conduct. These poor people entertained such dread of a ship of war, that they stipulated not to be embarked in Lieutenant Parry's vessels, if we should find them on the coast; a condition with which they would gladly have dispensed, had that desirable event taken place. As we required a Canadian foreman and steersman for the other canoe, we were compelled to wait for the appearance of the Isle à la Crosse canoes under Mr. Clark.

On the 8th Mr. Williams embarked for York Fort. He gave us a circular letter addressed to the Chiefs of the Hudson's Bay Company's posts, directing them to afford us all possible assistance on our route, and he promised to exert every endeavour to forward the Esquimaux interpreter, upon whom the success of our journey so much depended. He was accompanied by eight boats. With him we sent our collections of plants, minerals, charts, and drawings, to be transmitted to England by the Hudson's Bay ships. After this period, our detention, though short, cost us more vexation than the whole time we had passed at Cumberland House, because every hour of the short summer was invaluable to us. On the 11th Mr. Clark arrived, and completed our crews. He brought letters from Mr. Franklin, dated March 28th, at Fort Chipewyan, where he was engaged procuring hunters and interpreters. A heavy storm of wind and rain from the north-east again delayed us till the morning of the 13th. The account we had received at York Factory of the numerous stores at Cumberland House proved to be very erroneous. The most material stores we received did not amount, in addition to our own, to more than two barrels of powder, a keg of spirits, and two pieces of tobacco, with pemmican for sixteen days.

The crew of Dr. Richardson's canoe consisted of three Englishmen and three Canadians, and the other carried five Canadians; both were deeply laden, and the waves ran high on the lake. No person in our party being well acquainted with the rivers to the northward, Mr. Conolly gave us a pilot, on condition that we should

exchange him when we met with the Athabasca brigade of canoes. At four A.M. we embarked.

We soon found that birchen-bark canoes were not calculated to brave rough weather on a large lake, for we were compelled to land on the opposite border, to free them from the water which had already saturated their cargoes. The wind became more moderate, and we were enabled, after traversing a chain of smaller lakes, to enter the mouth of the Sturgeon River, at sunset, where we encamped.

The lading of the canoes is always, if possible, carried on shore at night, and the canoes taken out of the water. The following evening we reached Beaver Lake, and landed to repair some damages sustained by the canoes. A round stone will displace the lading of a canoe, without doing any injury, but a slight blow against a sharp corner penetrates the bark. For the purpose of repairing it, a small quantity of gum or pitch, bark and pine roots, are embarked, and the business is so expeditiously performed, that the speed of the canoe amply compensates for every delay. The Sturgeon River is justly called by the Canadians La Riviére Maligne, from its numerous and dangerous rapids. Against the strength of a rapid it is impossible to effect any progress by paddling, and the canoes are tracked, or if the bank will not admit of it, propelled with poles, in the management of which the Canadians shew great dexterity. Their simultaneous motions were strongly contrasted with the awkward confusion of the inexperienced Englishmen, deafened by the torrent, who sustained the blame of every accident which occurred.

At sunset we encamped on an island in Beaver Lake, and at four A.M., the next morning, passed the first portage in the Ridge River. Beaver Lake is twelve miles in length, and six in breadth. The flat limestone country rises into bold rocks on its banks, and at the mouth of the Ridge River, the limestone discontinues. The lake is very deep, and has already been noticed for the number and

excellence of its fish. The Ridge River is rapid and shallow. We had emerged from the muddy channels through an alluvial soil, and the primitive rocks interrupted our way with frequent portages, through the whole route to Isle à la Crosse Lake. At two P.M. we passed the mouth of the Hay River, running from the westward; and the ridge above its confluence takes the name of the Great River, which rises at the height of land called the Frog Portage.

The thermometer was this day 100° in the sun, and the heat was extremely oppressive, from our constant exposure to it. We crossed three portages in the Great River, and encamped at the last; here we met the director of the North-West Company's affairs in the north, Mr. Stuart, on his way to Fort William, in a light canoe. He had left the Athabasca Lake only thirteen days, and brought letters from Mr. Franklin, who desired that we would endeavour to collect stores of every kind at Isle à la Cosse, and added a favourable account of the country, to the northward of the Slave Lake.

On the 16th, at three A.M., we continued our course, the river increasing to the breadth of half a mile, with many rapids between the rocky islands. The banks were luxuriantly clothed with pines, poplars, and birch trees, of the largest size; but the different shades of green were undistinguishable at a distance, and the glow of autumnal colours was wanting to render the variety beautiful.

Having crossed two portages at the different extremities of the Island Lake, we ran through two extensive sheets of water under sail, called the Heron and Pelican Lakes; the former of which is fifteen miles in length, and the latter five; but its extent to the southward has not been explored. An intricate channel, with four small portages, conducted us to the Woody Lake. Its borders were, indeed, walls of pines, hiding the face of steep and high rocks; and we wandered in search of a landing-place till ten P.M., when we were forced to take shelter from an impending storm, on a small island, where we wedged ourselves between the trees. But though

we secured the canoes, we incurred a personal evil of much greater magnitude, in the torments inflicted by the musquitoes, a plague which had grown upon us since our departure from Cumberland House, and which infested us during the whole summer; we found no relief from their attacks by exposing ourselves to the utmost violence of the wind and rain. Our last resource was to plunge ourselves in the water, and from this uncomfortable situation we gladly escaped at day-light, and hoisted our sails.

The Woody Lake is thirteen miles in length, and a small grassy channel at its north-western extremity, leads to the Frog Portage, the source of the waters descending by Beaver Lake to the Saskatchawan. The distance to the Missinnippi, or Churchill River, is only three hundred and eighty yards; and as its course crosses the height nearly at right angles to the direction of the Great River, it would be superfluous to compute the elevation at this place. The portage is in latitude 55° 26′ 0″ N., and longitude 103° 34′ 50″ W. Its name, according to Sir Alexander Mackenzie, is derived from the Crees having left suspended a stretched frog's skin, in derision of the Northern Indian mode of dressing the beaver.

The part of the Missinnippi, in which we embarked, we should have mistaken for a lake, had it not been for the rapidity of the current against which we made our way. At four P.M. we passed a long portage, occasioned by a ledge of rocks, three hundred yards in length, over which the river falls seven or eight feet. After crossing another portage we encamped.

On the 18th we had rain, wind, and thunder, the whole day; but this weather was much preferable to the heat we had borne hitherto. We passed three portages, and, at six P.M., encamped on the north bank. Below the third portage is the mouth of the Rapid River, flowing from a large lake to the southward, on which a post was formerly maintained by the North-West Company. Next morning we found ourselves involved in a confused mass of islands, through

the openings of which we could not discern the shore. The guide's knowledge of the river did not extend beyond the last portage, and our perplexity continued, till we observed some foam floating on the water, and took the direction from which it came. The noise of a heavy fall, at the Mountain Portage, reached our ears, at the distance of four miles, and we arrived there at eight A.M. The portage was a difficult ascent over a rocky island, between which and the main shore were two cataracts, and a third in sight above them, making another portage. We surprised a large brown bear, which immediately retreated into the woods. To the northward of the second portages we again found the channels intricate, but the shores being sometimes visible we ventured to proceed. The character of the country was new, and more interesting than before. The mountainous and strong elevations receded from the banks, and the woods crept through their breaches to the valleys behind; the adventurous pine alone ascending their bases, and braving storms unfelt below.

At noon, we landed at the Otter Portage, where the river ran with great velocity for half a mile, among large stones. Having carried across the principal part of the cargo, the people attempted to track the canoes along the edge of the rapid. With the first they succeeded, but the other, in which were the foreman and steersman, was overset and swept away by the current. An account of this misfortune was speedily conveyed to the upper end of the portage, and the men launched the remaining canoe into the rapid, though wholly unacquainted with the dangers of it. The descent was quickly accomplished, and they perceived the bottom of the lost canoe above water in a little bay, whither it had been whirled by the eddy. One man had reached the bank, but no traces could be found of the foreman, Louis Saint Jean. We saved the canoe, out of which two guns and a case of preserved meats had been thrown

into the rapid*. So early a disaster deeply affected the spirits of the Canadians, and their natural vivacity gave way to melancholy forebodings, while they erected a wooden cross in the rocks near the spot where their companion perished.

The loss of this man's services, and the necessity of procuring a guide, determined us to wait for the arrival of the North-West Company's people from Fort Chipewyan, and we encamped accordingly. The canoe was much shattered, but as the gun wales were not broken, we easily repaired it. In the evening a N. W. canoe arrived, with two of the partners. They gave us an account of Mr. Franklin's proceedings, and referred us to the brigade following them for a guide.

During the 20th it rained heavily, and we passed the day in anxious suspense confined to our tents. A black bear came to the bank on the opposite side of the river, and on seeing us, glided behind the trees.

Late on the 21st Mr. Robertson, of the Hudson Bay Company arrived, and furnished us with a guide, but desired that he might be exchanged when we met the northern canoes. We took advantage of the remainder of the day, to cross the next portage, which was three-fourths of a mile in length.

On the 22nd we crossed three small portages, and encamped at the fourth. At one of them we passed some of the Hudson's Bay Company's canoes, and our application to them was unsuccessful. We began to suspect that Isle à la Crosse was the nearest place at which we might hope for assistance. However, on the morning of the 23rd as we were about to embark, we encountered the last brigades of canoes belonging to both the Companies, and obtained a guide and foreman from them. Thus completely equipped, we

* Mr. Hood himself was the first to leap into the canoe and incite the men to follow him, and shoot the rapid to save the lives of their companions.—Dr. Richardson's Journal.

entered the Black Bear Island Lake, the navigation of which requires a very experienced pilot. Its length is twenty-two miles, and its breadth varies from three to five, yet it is so choaked with islands, that no channel is to be found through it, exceeding a mile in breadth. At sunset we landed; and encamped on an island, and at six A. M. on the 24th, left the lake, and crossed three portages into another, which has, probably, several communications with the last, as that by which we passed is too narrow to convey the whole body of the Missinnippi. At one of these portages called the Pin Portage is a rapid, about ten yards in length, with a descent of ten or twelve feet, and beset with rocks. Light canoes sometimes venture down this fatal gulf, to avoid the portage, unappalled by the warning crosses which overhang the brink, the mournful records of former failures.

The Hudson's Bay Company's people whom we passed on the 23rd, going to the rock house with their furs, were badly provided with food, of which we saw distressing proofs at every portage behind them. They had stripped the birch trees of their rind to procure the soft pulpy vessels in contact with the wood, which are sweet, but very insufficient to satisfy a craving appetite.

The lake to the westward of the Pin Portage, is called Sandfly Lake; it is seven miles long, and a wide channel connects it with the Serpent Lake, the extent of which to the southward we could not discern. There is nothing remarkable in this chain of lakes, except their shapes being rocky basins filled by the waters of the Missinnippi, insulating the massy eminences, and meandering with almost imperceptible current between them. From the Serpent to the Sandy Lake, it is again confined in a narrow space by the approach of its winding banks, and on the 26th we were some hours employed in traversing a series of shallow rapids, where it was necessary to lighten the canoes. Having missed the path through the woods, we walked two miles in the water upon sharp stones, from which some

person was incessantly slipping into deep holes, and floundering in vain for footing at the bottom; a scene highly diverting, notwithstanding our fatigue. We were detained in Sandy Lake, till one P.M., by a strong gale, when the wind becoming moderate we crossed five miles to the mouth of the river, and at four P. M. left the main branch of it, and entered a little rivulet called the Grassy River, running through an extensive reedy swamp. It is the nest of innumerable ducks, which rear their young, among the long rushes, in security from beasts of prey. At sunset we encamped on the banks of the main branch.

At three A. M. June 28th, we embarked in a thick fog occasioned by a fall of the temperature of the air ten degrees below that of the water. Having crossed Knee Lake, which is nine miles in length, and a portage at its western extremity, we entered Primeau Lake, with a strong and favourable wind, by the aid of which we ran nineteen miles through it, and encamped at the river's mouth. It is shaped like the barb of an arrow, with the point towards the north, and its greatest breadth is about four miles.

During the night, a torrent of rain washed us from our beds, accompanied with the loudest thunder I ever heard. This weather continued during the 29th, and often compelled us to land, and turn the canoes up, to prevent them from filling. We passed one portage, and the confluence of a river, said to afford, by other rivers beyond a height of land, a shorter but more difficult route to the Athabasca Lake than that which is generally pursued.

On the 28th we crossed the last portage, and at ten A. M. entered the Isle à la Crosse Lake. Its long succession of woody points, both banks stretching towards the south, till their forms were lost in the haze of the horizon, was a grateful prospect to us, after our bewildered and interrupted voyage in the Missinnippi. The gale wafted us with unusual speed, and as the lake increased in breadth, the waves swelled to a dangerous height. A canoe running

before the wind is very liable to burst asunder, when on the top of a wave, so that part of the bottom is out of the water; for there is nothing to support the weight of its heavy cargo but the bark, and the slight gunwales attached to it.

On making known our exigencies to the gentlemen in charge of the Hudson's Bay and North West Companies' forts, they made up an assortment of stores, amounting to five bales; for four of which we were indebted to Mr. Mac Leod of the North West Company, who shared with us the ammunition absolutely required for the support of his post; receiving in exchange an order for the same quantity upon the cargo which we expected to follow us from York Factory. We had heard from Mr. Stuart that Fort Chipewyan was too much impoverished to supply the wants of the expedition, and we found Isle à la Crosse in the same condition; which indeed we might have foreseen, from the exhausted state of Cumberland House, but could not have provided against. We never had heard before our departure from York, that the posts in the interior only received annually the stores necessary for the consumption of a single year. It was fortunate for us that Mr. Franklin had desired ten bags of pemmican to be sent from the Saskatchawan across the plains to Isle à la Crosse for our use. This resource was untouched, but we could not embark more than five pieces in our own canoes. However Mr. Mac Leod agreed to send a canoe after us to the Methye Portage, with the pemmican, and we calculated that the diminution of our provision would there enable us to receive it.

The Beaver River enters it on the S.E. side, and another river which has not been named, on the S.W. Both these rivers are branches of the Missinnippi, as it is the only outlet from the lake. The banks appeared to be rocky, and the beach in many places sandy, but its waters are yellow and muddy. It produces a variety of fish, among which its white fish are esteemed the best in the country. The only birds visible at this season, are common to every part of

the Missinnippi; gulls, ducks, pigeons, goatsuckers, and the raven; the geese and swans pay a momentary visit in passing to the north and returning.

There was little in the forts differing from the establishments that we had before seen. The ground on which they are erected is sandy, and favourable to cultivation. Curiosity, however, was satisfied by the first experiment, and utility alone has been unable to extend it. Isle à la Crosse is frequented by the Crees and the Chipewyans. It is not the dread of the Indians, but of one another, that has brought the rival Companies so close together at every trading post; each party seeking to prevent the other from engaging the affections of the natives, and monopolizing the trade. Whenever a settlement is made by the one, the other immediately follows, without considering the eligibility of the place; for it may injure its opponent, though it cannot benefit itself, which is the first object of all other commercial bodies, but the second of the fur traders.

On the evening of the 30th we embarked, and entered a wide channel to the northward of the forts, and extending towards the north-west. It gradually decreased in breadth till it became a river, which is the third fork of the Missinnippi, and its current being almost insensible, we entered the clear lake at ten A.M. on the 1st of July. Of this lake, which is very large, no part is known except the south border, but its extent would lead us to conclude, that its evaporation must be supplied by another river to the northward, especially as the small channel that communicates with Buffalo Lake is motionless. The existence of such a river is asserted by the Indians, and a shorter passage might be found by it across the height of land to the Clear Water River, than the portage from the Methye Lake.

In Buffalo Lake the wind was too strong for us to proceed, and we therefore encamped upon a gravel beach thrown up by the waves. We embarked at three A.M. July 2d, and at four P.M., entered the

mouth of the Methye River. The lake is thirty-four miles in length, and fourteen in breadth. It is probably very deep, for we saw no islands in this wide expanse, except at the borders. On the south-west side were two forts, belonging to the Companies, and near them a solitary hill seven or eight hundred feet high. At eight P.M. we encamped in the Methye River, at the confluence of the river Pembina. A route has been explored by it to the Red Willow River, across the height of land, but the difficulties of it were so great, that the ordinary route is preferred.

On the 3d we passed through the Methye River, and encamped on the borders of the Methye Lake. The soil from Isle à la Crosse to this place is sandy, with some portion of clay, and the trees numerous; but the Methye River is stoney, and so shallow, that, to lighten the canoes, we made two portages of five and two miles. The paths were overflowed with cold spring water, and barricadoed by fallen trees; we should have been contented to immerse ourselves wholly had the puddle been sufficiently deep, for the musquitoes devoured every part that was exposed to them.

On the 4th we crossed the Methye Lake, and landed at the portage on the north-west side, in one of the sources of the Missinnippi. The lake is seventeen miles in length, with a large island in the middle. We proceeded to the north side of the portage with two men, carrying a tent and some instruments, leaving the canoes and cargoes to be transported by daily journeys of two or three miles. The distance is fourteen statute miles, and there are two small lakes about five miles from the north side. Several species of fish were found in them, though they have no known communication with any other body of water, being situated on the elevation of the height. The road was a gentle ascent, miry from the late rainy weather, and shaded by pines, poplars, birches, and cypresses, which terminated our view. On the north side we discovered through an opening in the trees, that we were on a hill eight or nine hundred

feet high, and at the edge of a steep descent. We were prepared to expect an extensive prospect, but the magnificent scene before us was so superior to what the nature of the country had promised, that it banished even our sense of suffering from the musquitoes, which hovered in clouds about our heads. Two parallel chains of hills extended towards the setting sun, their various projecting outlines exhibiting the several gradations of distance, and the opposite bases closing at the horizon. On the nearest eminence, the objects were clearly defined by their dark shadows; the yellow rays blended their softening hues with brilliant green on the next, and beyond it all distinction melted into gray and purple. In the long valley between, the smooth and colourless Clear Water River wound its spiral course, broken and shattered by encroaching woods. An exuberance of rich herbage covered the soil, and lofty trees climbed the precipice at our feet, hiding its brink with their summits. Impatient as we were, and blinded with pain, we paid a tribute of admiration, which this beautiful landscape is capable of exciting, unaided by the borrowed charms of a calm atmosphere, glowing with the vivid tints of evening.

We descended to the banks of the Clear Water River, and having encamped, the two men returned to assist their companions. We had sometimes before procured a little rest, by closing the tent, and burning wood, or flashing gunpowder within, the smoke driving the musquitoes into the crannies of the ground. But this remedy was now ineffectual, though we employed it so perseveringly as to hazard suffocation: they swarmed under our blankets, goring us with their envenomed trunks, and steeping our clothes in blood. We rose at day-light in a fever, and our misery was unmitigated during our whole stay.

The musquitoes of America resemble, in shape, those of Africa and Europe, but differ essentially in size and other particulars. There are two distinct species, the largest of which is brown, and

the smallest black. Where they are bred cannot easily be determined, for they are numerous in every soil. They make their first appearance in May, and the cold destroys them in September; in July they are most voracious; and fortunately for the traders, the journeys from the trading posts to the factories are generally concluded at that period. The food of the musquito is blood, which it can extract by penetrating the hide of a buffalo; and if it is not disturbed, it gorges itself so as to swell its body into a transparent globe. The wound does not swell, like that of the African musquito, but it is infinitely more painful; and when multiplied an hundred fold, and continued for so many successive days, it becomes an evil of such magnitude, that cold, famine, and every other concomitant of an inhospitable climate, must yield the pre-eminence to it. It chases the buffalo to the plains, irritating him to madness; and the rein-deer to the sea-shore, from which they do not return till the scourge has ceased.

On the 6th the thermometer was 106° in the sun, and on the 7th 110°. The musquitoes sought the shade in the heat of the day, which we felt no inclination to contend with them. It was some satisfaction to us to see the havoc made among them by a large and beautiful species of dragon fly, called the musquito hawk, which wheeled through their retreats, swallowing its prey without a momentary diminution of its speed. But the temporary relief that we had hoped for was only an exchange of tormentors: our new assailant, the horse-fly, or bull-dog, ranged in the hottest glare of the sun, and carried off a portion of flesh at each attack. Another noxious insect, the smallest, but not the least formidable, was the sand-fly, known in Canada by the name of the brulot. To such annoyance all travellers must submit, and it would be unworthy to complain of that grievance in the pursuit of knowledge, which is endured for the sake of profit. This detail of it has only been made as an excuse for the scantiness of our observations on the most interesting part of the country through which we passed.

The north side of the Methye portage is in latitude 56° 41′ 40″ N. and longitude 109° 52′ 0″ W. It is, by our course, one hundred and twenty-four miles from Isle à la Crosse, and considered as a branch of the Missinnippi, five hundred and ninety-two miles from the Frog portage. The clear water-river passing through the valley, described above, evidently rises not far to the eastward. The height, computed by the same mode as that of the Echiamamis, by allowing a foot for each mile of distance, and six feet on an average, for each fall and rapid, is two thousand four hundred and sixty-seven feet above the level of the sea, admitting it to be nine hundred feet above the Clear Water-River. The country, in a line between it and the mouth of Mackenzie's river, is a continual descent, although to the eastward of that line, there may be several heights between it and the Arctic sea. To the eastward, the lands descend to Hudson's bay; and to the westward also, till the Athabasca river cuts through it, from whence it ascends to the rocky mountains. Daring was the spirit of enterprise that first led Commerce, with her cumbrous train, from the waters of Hudson's Bay to those of the Arctic sea, across an obstacle to navigation so stupendous as this; and persevering has been the industry which drew riches from a source so remote.

On the 8th two men arrived, and informed us, that they had brought us our ten bags of pemmican, from Isle à la Crosse, but that they were found to be rotten. Thus were we unexpectedly deprived of the most essential of our stores, for we knew Fort Chepewyan to be destitute of provisions, and that Mr. Franklin depended upon us for a supply, whereas, enough did not remain for our own use. On the 9th, the canoes and cargoes reached the north side of the portage. Our people had selected two bags of pemmican less mouldy than the rest, which they left on the beach. Its decay was caused by some defect in the mode of mixing it.

On the 10th, we embarked in the Clear Water River; and proceeded down the current. The hills, the banks, and bed of the river, were

composed of fine yellow sand, with some limestone rocks. The surface soil was alluvial. At eight A.M. we passed a portage on which the limestone rocks were singularly scattered through the woods, bearing the appearance of houses and turrets overgrown with moss. The earth emitted a hollow sound, and the river was divided by rocks, into narrow crooked channels, every object indicating that some convulsion had disturbed the general order of nature at this place. We had passed a portage above it, and after two long portages below it we encamped. Near the last was a small stream so strongly impregnated with sulphur, as to taint the air to a great distance around it. We saw two brown bears on the hills in the course of the day.

At day-light, on the 11th, we embarked. The hills continued on both sides to the mouth of the river, varying from eight hundred to one thousand feet in height. They declined to the banks in long green slopes, diversified by woody mounds and copses. The pines were not here in thick impenetrable masses, but perched aloft in single groups on the heights, or shrouded by the livelier hues of the poplar and willow.

We passed the mouth of the Red Willow River on the south bank, flowing through a deep ravine. It is the continuation of the route by the Pembina, before mentioned. At noon we entered the majestic Athabasca or Elk River. Its junction with the Clear Water River is called the Forks. Its banks were inaccessible cliffs, apparently of clay and stones, about two hundred feet high, and its windings in the south were encircled by high mountains. Its breadth exceeded half a mile, and was swelled to a mile in many places by long muddy islands in the middle covered with trees. No more portages interrupted our course, but a swift current hurried us towards the quarter in which our anticipated discoveries were to commence. The passing cliffs returned a loud confusion of echoes to the sprightly canoe song, and the dashing paddles; and the eagles,

watching with half-closed eyes on the pine tops, started from their airy rest, and prepared their drowsy pinions for the flight.

About twenty miles from the Forks are some salt-pits and plains, said to be very extensive. The height of the banks was reduced to twenty or thirty feet, and the hills ranged themselves at an increased distance from the banks in the same variety as those of the Clear Water River. At sunset we encamped on a small sandy island, but the next morning made a speedy retreat to the canoes, the water having nearly overflown our encampment. We passed two deserted settlements of the fur traders on opposite banks, at a place called Pierre au Calumet. Beyond it the hills disappeared, and the banks were no longer visible above the trees. The river carries away yearly large portions of soil, which increases its breadth, and diminishes its depth, rendering the water so muddy that it was scarcely drinkable. Whole forests of timber are drifted down the stream, and choke up the channels between the islands at its mouth. We observed the traces of herds of buffaloes, where they had crossed the river, the trees being trodden down and strewed, as if by a whirlwind.

At four P.M. we left the main branch of the Athabasca, entering a small river, called the Embarras. It is narrow and muddy, with pines of an enormous size on its banks. Some of them are two hundred feet high, and three or four feet in diameter. At nine P.M. we landed and encamped; but finding ourselves in a nest of musquitoes, we continued our journey before day-break; and at eight A.M., emerged into the Athabasca lake. A strong wind agitated this sea of fresh water, which, however, we crossed without any accident, and landed on the north side of it, at Fort Chipewyan; where we had the satisfaction of finding our companions in good health, and of experiencing that sympathy in our anxiety on the state of our affairs, the reality of which was only to be expected from those who were to share our future fortunes.

CHAPTER VI.

Departure from Chipewyan—Difficulties of the various Navigations of the Rivers, and Lakes, and of the Portages—Slave Lake and Fort Providence—Scarcity of Provisions, and discontent of the Canadian Voyagers—Difficulties with regard to the Indian Guides—Refusal to proceed—Visit of Observation to the Upper part of Copper-Mine River—Return to the Winter-Quarters of Fort Enterprise.

1820. July 18. EARLY this morning the stores were distributed to the three canoes. Our stock of provision unfortunately did not amount to more than sufficient for one day's consumption, exclusive of two barrels of flour, three cases of preserved meats, some chocolate, arrow-root, and portable soup, which we had brought from England, and intended to reserve for our journey to the coast next season. Seventy pounds of moose meat and a little barley were all that Mr. Smith was enabled to give us. It was gratifying, however, to perceive that this scarcity of food did not depress the spirits of our Canadian companions, who cheerfully loaded their canoes, and embarked in high glee after they had received the customary dram. At noon we bade farewell to our kind friend Mr. Smith. The crews commenced a lively paddling song on quitting the shore, which was continued until we had lost sight of the houses. We soon reached the western boundary of the lake, and at two entered the Stoney River, one of the discharges of the Athabasca Lake into the Slave River, and having a favouring current passed swiftly along. This narrow stream is confined between low swampy banks, which sup-

port willows, dwarf birch, and alder. At five we passed its conflux with the Peace River. The Slave River, formed by the union of these streams, is about three quarters of a mile wide. We descended this magnificent river, with much rapidity, and after passing through several narrow channels, formed by an assemblage of islands, crossed a spot where the waters had a violent whirling motion, which, when the river is low, is said to subside into a dangerous rapid; on the present occasion no other inconvenience was felt than the inability of steering the canoes, which were whirled about in every direction by the eddies, until the current carried them beyond their influence. We encamped at seven, on the swampy bank of the river, but had scarcely pitched the tents before we were visited by a terrible thunder-storm; the rain fell in torrents, and the violence of the wind caused the river to overflow its banks, so that we were completely flooded. Swarms of musquitoes succeeded the storm, and their tormenting stings, superadded to other inconveniences, induced us to embark, and, after taking a hasty supper, to pursue our voyage down the stream during the night.

At six on the following morning we passed the Reindeer Islands, and at ten reached the entrance of the Dog River, where we halted to set the fishing nets. These were examined in the evening, but to our mortification we obtained only four small trout, and were compelled to issue part of our preserved meats for supper. The latitude of the mouth of Dog River, was observed 59° 52′ 16″ N.

The nets were taken up at day-light, but they furnished only a solitary pike. We lost no time in embarking, and crossed the crooked channel of the Dog Rapid, when two of the canoes came in such violent contact with each other, that the sternmost had its bow broken off. We were fortunately near to the shore or the disabled canoe would have sunk. The injury being repaired in two hours, we again embarked, and having descended another rapid, arrived at the Cassette Portage of four hundred and sixty paces,

over which the cargoes and canoes were carried in about twenty-six minutes. We next passed through a narrow channel full of rapids, crossed the Portage d'Embarras of seventy yards; and the portage of the Little Rock, of three hundred yards, at which another accident happened to one of the canoes, by the bowman slipping and letting it fall upon a rock, and breaking it in two. Two hours were occupied in sewing the detached pieces together, and covering the seam with pitch; but this being done it was as effective as before. After leaving this place we soon came to the next portage, of two hundred and seventy-three paces; and shortly afterwards to the Mountain Portage, of one hundred and twenty: which is appropriately named, as the path leads over the summit of a high hill. This elevated situation commands a very grand and picturesque view, for some miles along the river, which at this part is about a mile wide.

We next crossed a portage of one hundred and twenty yards; and then the Pelican Portage, of eight hundred paces. Mr. Back took an accurate sketch of the interesting scenery which the river presents at this place. After descending six miles further we came to the last portage on the route to Slave Lake which we crossed, and encamped in its lower end. It is called "*The Portage of the Drowned,*" and it received that name from a melancholy accident which took place many years ago. Two canoes arrived at the upper end of the portage, in one of which there was an experienced guide. This man judging from the height of the river, deemed it practicable to shoot the rapid, and determined upon trying it. He accordingly placed himself in the bow of his canoe, having previously agreed, that if the passage was found easy, he should, on reaching the bottom of the rapid, fire a musket, as a signal for the other canoe to follow. The rapid proved dangerous, and called forth all the skill of the guide, and the utmost exertion of his crew, and they narrowly escaped destruction. Just as they were landing, an unfor-

tunate fellow seizing the loaded fowling-piece, fired at a duck which rose at the instant. The guide anticipating the consequences, ran with the utmost haste to the other end of the portage, but he was too late: the other canoe had pushed off, and he arrived only to witness the fate of his comrades. They got alarmed in the middle of the rapid, the canoe was upset, and every man perished.

The various rapids we have passed to-day, are produced by an assemblage of islands and rocky ledges, which obstruct the river, and divide it into many narrow channels. Two of these channels are rendered still more difficult by accumulations of drift timber; a circumstance which has given a name to one of the portages. The rocks which form the bed of the river, and the numerous islands, belong to the granite formation. The distance made to-day was thirteen miles.

July 21.—We embarked at four A.M. and pursued our course down the river. The rocks cease at the last portage; and below it the banks are composed of alluvial soil, which is held together by the roots of the trees and shrubs that crown their summits. The river is about a mile wide, and the current is greatly diminished. At eight we landed at the mouth of the Salt River, and pitched our tents, intending to remain here this and the next day for the purpose of fishing. After breakfast, which made another inroad on our preserved meats, we proceeded up the river in a light canoe, to visit the salt springs, leaving a party behind to attend the nets. This river is about one hundred yards wide at its mouth. Its waters did not become brackish until we had ascended it seven or eight miles; but when we had passed several rivulets of fresh water which flowed in, the main stream became very salt, at the same time contracting to the width of fifteen or twenty yards. At a distance of twenty-two miles, including the windings of the river the plains commence. Having pitched the tent at this spot, we set out to visit the principal springs, and walked about three miles

when the musquitoes compelled us to give up our project. We did not see the termination of the plains toward the east, but on the north and west they are bounded by an even ridge, about six or seven hundred feet in height. Several salt springs issue from the foot of this ridge, and spread their waters over the plain, which consists of tenacious clay. During the summer much evaporation takes place, and large heaps of salt are left behind crystallized in the form of cubes. Some beds of greyish compact gypsum were exposed on the sides of the hills.

The next morning after filling some casks with salt for our use during winter, we embarked to return, and had descended the river a few miles, when turning round a point, we perceived a buffalo plunge into the river before us. Eager to secure so valuable a prize, we instantly opened a fire upon him from four muskets, and in a few minutes he fell, but not before he had received fourteen balls. The carcass was towed to the bank, and the canoe speedily laden with meat. After this piece of good fortune, we descended the stream merrily, our voyagers chanting their liveliest songs. On arrival at the mouth of the river, we found that our nets had not produced more than enough to supply a scanty meal to the men whom we had left behind, but this was now of little importance as the acquisition of meat we had made, would enable us to proceed without more delay to Slave Lake. The *Poisson Inconnu* mentioned by Mackenzie, is found here. It is a species of the Genus Salmo, and is said by the Indians to ascend from the Arctic Sea, but being unable to pass the cascades of the Slave River, is not found higher than this place. In the evening a violent thunder-storm came on with heavy rain; thermometer 70°.

At a very early hour on the following morning, we embarked, and continued to paddle against a very strong wind and high waves, under the shelter of the bank of the rivers, until two P.M., when having arrived at a more exposed part of the stream, the canoes

took in so much water that we were obliged to disembark on a small island. The river here is from one mile and a quarter to one mile and three quarters wide. Its banks are of moderate height, sandy, and well wooded.

July 24.—We made more progress notwithstanding the continuance of the wind. The course of the river is very winding, making in one place a circuit of seven or eight miles round a peninsula, which is joined to the west bank by a narrow isthmus. Near the foot of this elbow, a long island occupies the centre of the river, which it divides into two channels. The longitude was obtained near to it 113° 25′ 36″, and variation 27° 25′ 14″ N., and the latitude 60° 54′ 52″ N., about four miles farther down. We passed the mouth of a broad channel leading to the north-east, termed La Grande Rivière de Jean, one of the two large branches by which the river pours its waters into the Great Slave Lake; the flooded *delta*, at the mouth of the river is intersected by several smaller channels, through one of which, called the Channel of the Scaffold, we pursued our voyage on the following morning, and by eight A.M. reached the establishment of the North-West Company on Moose Deer Island. We found letters from Mr. Wentzel, dated Fort Providence, on the north side of the lake which communicated to us, that there was an Indian guide waiting for us at that post; but, that the chief and the hunters, who were to accompany us, had gone to a short distance to hunt. They were becoming impatient at our delay.

Soon after landing, I visited the Hudson's Bay post on the same island, and engaged Pierre St. German, an interpreter for the Copper Indians. We regretted to find the posts of both the Companies extremely bare of provision; but as the gentlemen in charge had despatched men on the preceding evening, to a band of Indians, in search of meat, and they promised to furnish us with whatever should be brought, it was deemed advisable to wait for their return, as the smallest supply was now of importance to us. Advantage

was taken of the delay to repair effectually the canoe, which had been broken in the Dog Rapid. On the next evening, the men arrived with the meat, and enabled Mr. M'Cleod, of the North-West Company, to furnish us with four hundred pounds of dried provisions. Mr. M'Vicar, of the Hudson's Bay Company, also supplied one hundred and fifty pounds. This quantity we considered would be sufficient, until we could join the hunters. We also obtained three fishing-nets, a gun, and a pair of pistols, which were all the stores these posts could furnish, although the gentlemen in charge were much disposed to assist us.

Moose-Deer Island is about a mile in diameter, and rises towards the centre about three hundred feet above the lake. Its soil is in general sandy, in some parts swampy. The varieties of the northern berries grow abundantly on it. The North-West Company's fort is in latitude 61° 11′ 8″ N.; longitude 113° 51′ 37″ W., being two hundred and sixty statute miles distant from Fort Chipewyan, by the river course. The variation of the compass is 25° 40′ 47″ E. The houses of the two Companies are small, and have a bleak northern aspect. There are vast accumulations of drift wood, on the shore of the lake, brought down by the river, which afford plenty of fuel. The inhabitants live principally on the fish, which the lake at certain seasons furnishes in great abundance; of these, the white fish, trout, and *poisson inconnu* are considered the best. They also procure moose, buffalo, and rein-deer meat occasionally from their hunters; but these animals are generally found at the distance of several days' walk from the forts. The Indians who trade here are Chipewyans. Beavers, martens, foxes, and musk-rats, are caught in numbers, in the vicinity of this great body of water. The musquitoes are still a serious annoyance to us, but they are less numerous than before. They are in some degree replaced by a small sandfly, whose bite is succeeded by a copious flow of blood, and

considerable swelling, but is attended with incomparably less irritation, than the puncture of the musquito.

On the 27th of July we embarked at four A.M., and proceeded along the south shore of the lake, through a narrow channel, formed by some islands, beyond the confluence of the principal branch of the Slave River; and as far as Stoney Island, where we breakfasted. This island is merely a rock of gneiss, that rises forty or fifty feet above the lake, and is precipitous on the north side. As the day was fine, and the lake smooth, we ventured upon paddling across to the Rein-deer Islands, which were distant about thirteen miles in a northern direction, instead of pursuing the usual track by keeping further along the south shore, which inclines to the eastward from this point. These islands are numerous, and consist of granite, rising from one hundred to two hundred feet above the water. They are for the most part naked; but towards the centres of the larger ones, there is a little soil, and a few groves of pines. At seven in the evening we landed upon one of them, and encamped. On the following morning we ran before a strong breeze, and a heavy swell, for some hours, but at length were obliged to seek shelter on a large island adjoining to Isle à la Cache of Mackenzie, where the following observations were obtained: latitude 61° 50′ 18″ N., longitude 113° 21′ 40″ W., and variation 31° 2′ 06″ E.

The wind and swell having subsided in the afternoon, we re-embarked, and steered towards the western point of the Big Island of Mackenzie, and when four miles distant from it, had forty-two fathoms soundings. Passing between this island and a promontory of the main shore, termed Big Cape, we entered into a deep bay, which receives the waters from several rivers that come from the northward; and we immediately perceived a decrease in the temperature of the water, from 59° to 48°. We coasted along the eastern side of the bay, its western shore being always visible, but the

canoes were exposed to the hazard of being broken by the numerous sunken rocks, which were scattered in our track. We encamped for the night on a rocky island, and by eight A.M. on the following morning, arrived at Fort Providence, which is situated twenty-one miles from the entrance of the bay. The post is exclusively occupied by the North-West Company, the Hudson's Bay Company having no settlement to the northward of Great Slave Lake. We found Mr. Wentzel and our interpreter Jean Baptiste Adam here, with one of the Indian guides: but the chief of the tribe and his hunters were encamped with their families, some miles from the fort, in a good situation for fishing. Our arrival was announced to him by a fire on the top of a hill, and before night a messenger came to communicate his intention of seeing us next morning. The customary present, of tobacco and some other articles, was immediately sent to him.

Mr. Wentzel prepared me for the first conference with the Indians by mentioning all the information they had already given to him. The duties allotted to this gentleman were, the management of the Indians, the superintendence of the Canadian voyagers, the obtaining, and the general distribution, of the provision, and the issue of the other stores. These services he was well qualified to perform, having been accustomed to execute similar duties, during a residence of upwards of twenty years in this country. We also deemed Mr. Wentzel to be a great acquisition to our party, as a check on the interpreters, he being one of the few traders who speak the Chipewyan language.

As we were informed that external appearances made lasting impressions on the Indians, we prepared for the interview by decorating ourselves in uniform, and suspending a medal round each of our necks. Our tents had been previously pitched, and over one of them a silken union flag was hoisted. Soon after noon, on July 30th, several Indian canoes were seen advancing in a regular line, and on

their approach, the chief was discovered in the headmost, which was paddled by two men. On landing at the fort, the chief assumed a very grave aspect, and walked up to Mr. Wentzel with a measured and dignified step, looking neither to the right nor to the left, at the persons who had assembled on the beach to witness his debarkation, but preserving the same immoveability of countenance until he reached the hall, and was introduced to the officers. When he had smoked his pipe, drank a small portion of spirits and water himself, and issued a glass to each of his companions, who had seated themselves on the floor, he commenced his harangue, by mentioning the circumstances that led to his agreeing to accompany the expedition, an engagement which he was quite prepared to fulfil. He was rejoiced, he said to see such great chiefs on his lands, his tribe were poor, but they loved white men who had been their benefactors; and he hoped that our visit would be productive of much good to them. The report which preceded our arrival, he said, had caused much grief to him. It was at first rumoured that a great medicine chief accompanied us, who was able to restore the dead to life; at this he rejoiced, the prospect of again seeing his departed relatives had enlivened his spirits, but his first communication with Mr. Wentzel had removed these vain hopes, and he felt as if his friends had a second time been torn from him. He now wished to be informed exactly of the nature of our expedition.

In reply to this speech, which I understood had been prepared for many days, I endeavoured to explain the objects of our mission in a manner best calculated to ensure his exertions in our service. With this view, I told him that we were sent out by the greatest chief in the world, who was the sovereign also of the trading companies in the country; that he was the friend of peace, and had the interest of every nation at heart. Having learned that his children in the north, were much in want of articles of merchandise, in consequence of the extreme length and difficulty of the present route; he had

Drawn by Lieut. Hood, R.N.

PORTRAIT OF AKAITCHO AND HIS SON.

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sent us to search for a passage by the sea, which if found, would enable large vessels to transport great quantities of goods more easily to their lands. That we had not come for the purpose of traffic, but solely to make discoveries for their benefit, as well as that of every other people. That we had been directed to inquire into the nature of all the productions of the countries we might pass through, and particularly respecting their inhabitants. That we desired the assistance of the Indians in guiding us, and providing us with food; finally, that we were most positively enjoined by the great chief to recommend that hostilities should cease throughout this country; and especially between the Indians and the Esquimaux, whom he considered his children, in common with other natives; and by way of enforcing the latter point more strongly, I assured him that a forfeiture of all the advantages which might be anticipated from the expedition would be a certain consequence, if any quarrel arose between his party and the Esquimaux. I also communicated to him that owing to the distance we had travelled, we had now few more stores than were necessary for the use of our own party, a part of these, however, should be forthwith presented to him; on his return he and his party should be remunerated with cloth, ammunition, tobacco, and some useful iron materials, besides having their debts to the North-West Company discharged.

The chief, whose name is Akaitcho or Big-foot, replied by a renewal of his assurances, that he and his party would attend us to the end of our journey, and that they would do their utmost to provide us with the means of subsistence. He admitted that his tribe had made war upon the Esquimaux, but said they were now desirous of peace, and unanimous in their opinion as to the necessity of all who accompanied us abstaining from every act of enmity against that nation. He added, however, that the Esquimaux were very treacherous, and therefore recommended that we should advance towards them with caution.

The communications which the chief and the guides then gave respecting the route to the Copper-Mine River, and its course to the sea, coincided in every material point with the statements which were made by Boileau and Black-meat at Chipewyan, but they differed in their descriptions of the coast. The information, however, collected from both sources was very vague and unsatisfactory. None of his tribe had been more than three days' march along the sea-coast to the eastward of the river's mouth.

As the water was unusually high this season, the Indian guides recommended our going by a shorter route to the Copper-Mine River than that they had first proposed to Mr. Wentzel, and they assigned as a reason for the change, that the rein-deer would be sooner found upon this track. They then drew a chart of the proposed route on the floor with charcoal, exhibiting a chain of twenty-five small lakes extending towards the north, about one half of them connected by a river which flows into Slave Lake, near Fort Providence. One of the guides, named Keskarrah, drew the Copper-Mine River, running through the Upper Lake in a westerly direction towards the Great Bear Lake, and then northerly to the sea. The other guide drew the river in a straight line to the sea from the above-mentioned place, but, after some dispute, admitted the correctness of the first delineation. The latter was elder brother to Akaitcho, and he said that he had accompanied Mr. Hearne on his journey, and though very young at the time, still remembered many of the circumstances, and particularly the massacre committed by the Indians on the Esquimaux.

They pointed out another lake to the southward of the river, about three days' journey distant from it, on which the chief proposed the next winter's establishment should be formed, as the rein-deer would pass there in the autumn and spring. Its waters contained fish, and there was a sufficiency of wood for building as well as for the winter's consumption. These were important considerations, and determined

me in pursuing the route they now proposed. They could not inform us what time we should take in reaching the lake, until they saw our manner of travelling in the large canoes, but they supposed we might be about twenty days, in which case I entertained the hope that if we could then procure provision we should have time to descend the Copper-Mine River for a considerable distance if not to the sea itself, and return to the lake before the winter set in.

It may here be proper to mention that it had been my original plan to descend the Mackenzie's River, and to cross the Great Bear Lake from the eastern side of which, Boileau informed me, there is a communication with the Copper-Mine River by four small lakes and portages; but, under our present circumstances, this course could not be followed, because it would remove us too far from the establishments, at the Great Slave Lake to receive the supplies of ammunition and some other stores in the winter which were absolutely necessary for the prosecution of our journey, or to get the Esquimaux interpreter, whom we expected. If I had not deemed these circumstances paramount I should have preferred the route by Bear Lake.

Akaitcho and the guides having communicated all the information they possessed on the different points to which our questions had been directed, I placed my medal round the neck of the chief, and the officers presented theirs to an elder brother of his and the two guides, communicating to them that these marks of distinction were given as tokens of our friendship and as pledges of the sincerity of our professions. Being conferred in the presence of all the hunters their acquisition was highly gratifying to them, but they studiously avoided any great expression of joy, because such an exposure would have been unbecoming the dignity which the senior Indians assume during a conference. They assured us, however, of their being duly sensible of these tokens of our regard, and that they should be preserved during their lives with the utmost care. The chief evinced

much penetration and intelligence during the whole of this conversation, which gave us a favourable opinion of his intellectual powers. He made many inquiries respecting the Discovery ships, under the command of Captain Parry, which had been mentioned to him, and asked why a passage had not been discovered long ago, if one existed. It may be stated that we gave a faithful explanation to all his inquiries, which policy would have prompted us to do if a love of truth had not; for whenever these northern nations detect a falsehood in the dealings of the traders, they make it an unceasing subject of reproach, and their confidence is irrecoverably lost.

We presented to the chief, the two guides, and the seven hunters, who had engaged to accompany us, some cloth, blankets, tobacco, knives, daggers, besides other useful iron materials, and a gun to each; also a keg of very weak spirits and water, which they kept until the evening, as they had to try their guns before dark, and make the necessary preparations for commencing the journey on the following day. The Indians, however, did not leave us on the next day, as the chief was desirous of being present, with his party, at the dance, which was given in the evening to our Canadian voyagers. They were highly entertained by the vivacity and agility displayed by our companions in their singing and dancing: and especially by their imitating the gestures of a Canadian, who placed himself in the most ludicrous postures; and, whenever this was done, the gravity of the chief gave way to violent bursts of laughter. In return for the gratification Akaitcho had enjoyed, he desired his young men to exhibit the Dog-Rib Indian dance; and immediately they ranged themselves in a circle, and, keeping their legs widely separated, began to jump simultaneously sideways; their bodies were bent, their hands placed on their hips, and they uttered forcibly the interjection *tsa* at each jump. Devoid as were their attitudes of grace, and their music of harmony, we were much amused by the novelty of the exhibition.

In the midst of this scene an untoward accident occurred, which for a time interrupted our amusements. The tent in which Dr. Richardson and I lodged having caught fire from some embers that had been placed in it to expel the musquitoes, was entirely burnt. Hepburn, who was sleeping within it, close to some powder, most providentially was awoke in time to throw it clear of the flame, and rescue the baggage, before any material injury had been received. We dreaded the consequences of this disaster upon the fickle minds of the Indians, and wished it not to be communicated to them. The chief, however, was soon informed of it by one of his people, and expressed his desire that no future misfortune should be concealed from him. We found he was most concerned to hear that the flag had been burnt, but we removed his anxiety on that point, by the assurance that it could easily be repaired. We were advised by Mr. Wentzel to recommence the dancing after this event, lest the Indians should imagine, by our putting a stop to it, that we considered the circumstance as an unfavourable commencement of our undertaking. We were, however, deeply impressed with a grateful sense of the Divine Providence, in averting the threatened destruction of our stores, which would have been fatal to every prospect of proceeding forward this season.

August 1.—This morning the Indians set out, intending to wait for us at the mouth of the Yellow Knife River. We remained behind to pack our stores, in bales of eighty pounds each, an operation which could not be done in the presence of these Indians, as they are in the habit of begging for every thing they see. Our stores consisted of two barrels of gunpowder, one hundred and forty pounds of ball and small shot, four fowling-pieces, a few old trading guns, eight pistols, twenty-four Indian daggers, some packages of knives, chisels, axes, nails, and fastenings for a boat; a few yards of cloth, some blankets, needles, looking-glasses, and beads; together with nine fishing-nets, having meshes of different

sizes. Our provision was two casks of flour, two hundred dried reindeer tongues, some dried moose meat, portable soup, and arrowroot, sufficient in the whole for ten days' consumption, besides two cases of chocolate, and two canisters of tea. We engaged another Canadian voyager at this place, and the expedition then consisted of twenty-eight persons, including the officers, and the wives of three of our voyagers, who were brought for the purpose of making shoes and clothes for the men at the winter establishment; there were also three children, belonging to two of these women *.

Our observations place Fort Providence in latitude 62° 17′ 19″ N., longitude 114° 9′ 28″ W.; the variation of the compass is 33° 35′ 55′ E., and dip of the needle 86° 38′ 02″. It is distant from Moose-Deer Island sixty-six geographic miles. This is the last establishment of the traders in this direction, but the North-West Company have two to the northward of it, on the Mackenzie River. It has been erected for the convenience of the Copper and Dog-rib Indians,

* The following is the list of the officers and men who composed the expedition on its departure from Fort Providence:

John Franklin, Lieutenant of the Royal Navy and Commander.
John Richardson, M.D., Surgeon of the Royal Navy.
Mr. George Back, of the Royal Navy, Admiralty Midshipman.
Mr. Robert Hood, of the Royal Navy, Admiralty Midshipman.
Mr. Frederick Wentzel, Clerk to the North-West Company.
John Hepburn, English seaman.

CANADIAN VOYAGERS.

Joseph Peltier,	Joseph Forcier,	Jean Baptiste Parent,
Mathew Pelonquin, dit Credit,	Ignace Perrault,	Jean Baptiste Belanger,
Solomon Belanger,	Francais Samandre,	Jean Baptiste Belleau,
Joseph Bennoit,	Gabriel Beauparlant	Emanuel Cournoyée,
Joseph Gagné,	Vincenza Fontano,	Michel Teroahauté an Troquois.
Pierre Dumas,	Registe Vaillant,	

INTERPRETERS.

Pierre St. Germain,	Jean Baptiste Adam.	Chipewyan Bois Brulés.

who generally bring such a quantity of rein-deer meat that the residents are enabled, out of their superabundance, to send annually some provision to the fort at Moose-Deer Island. They also occasionally procure moose and buffalo meat, but these animals are not numerous on this side of the lake. Few furs are collected. *Les poissons inconnus*, trout, pike, carp, and white fish are very plentiful, and on these the residents principally subsist. Their great supply of fish is procured in the latter part of September and the beginning of October, but there are a few taken daily in the nets during the winter. The surrounding country consists almost entirely of coarse grained granite, frequently enclosing large masses of reddish felspar. These rocks form hills which attain an elevation of three hundred or four hundred feet, about a mile behind the house; their surface is generally naked, but in the valleys between them a few spruces, aspens, and birches grow, together with a variety of shrubs and berry-bearing plants.

On the afternoon of the 2d of August we commenced our journey, having, in addition to our three canoes, a smaller one to convey the women; we were all in high spirits, being heartily glad that the time had at length arrived when our course was to be directed towards the Copper-Mine River, and through a line of country which had not been previously visited by any European. We proceeded to the northward, along the eastern side of a deep bay of the lake, passing through various channels, formed by an assemblage of rocky islands; and, at sun-set, encamped on a projecting point of the north main shore, eight miles from Fort Providence. To the westward of this arm, or bay, of the lake, there is another deep bay, that receives the waters of a river, which communicates with Great Marten Lake, where the North-West Company had once a post established. The eastern shores of the Great Slave Lake are very imperfectly known: none of the traders have visited them, and the Indians give such loose and unsatisfactory accounts, that

no estimation can be formed of its extent in that direction. These men say there is a communication from its eastern extremity by a chain of lakes, with a shallow river, which discharges its waters into the sea. This stream they call the Thlouee-tessy, and report it to be navigable for Indian canoes only. The forms of the south and western shores are better known from the survey of Sir Alexander Mackenzie, and in consequence of the canoes having to pass and repass along these borders annually, between Moose-Deer Island and Mackenzie's River. Our observations made the breadth of the lake, between Stoney Island, and the north main shore, sixty miles less than it is laid down in Arrowsmith's map; and there is also a considerable difference in the longitude of the eastern side of the bay, which we entered.

This lake, owing to its great depth, is seldom completely frozen over before the last week in November, and the ice, which is generally seven feet thick, breaks up about the middle of June, three weeks later than that of the Slave River. The only known outlet to this vast body of water, which receives so many streams on its north and south shores, is the Mackenzie's River.

August 3.—We embarked at three A.M., and proceeded to the entrance of the Yellow-Knife River of the traders, which is called by the natives Beg-ho-lo-dessy; or, River of the Toothless Fish. We found Akaitcho, and the hunters with their families, encamped here. There were also several other Indians of his tribe, who intended to accompany us some distance into the interior. This party was quickly in motion after our arrival, and we were soon surrounded by a fleet of seventeen Indian canoes. In company with them we paddled up the river, which is one hundred and fifty yards wide, and, in an hour, came to a cascade of five feet, where we were compelled to make a portage of one hundred and fifty-eight yards. We next crossed a dilatation of the river, about six miles in length, upon which the name of Lake Prosperous was

Engraved by F. Ivy Finden

EXPEDITION CROSSING LAKE PROSPEROUS.

bestowed. Its shores, though scantily supplied with wood, are very picturesque, as will appear from the annexed interesting sketch, by Mr. Hood, which exhibits an accurate representation of our brigade, at the time of passing through it.

Akaitcho caused himself to be paddled by his slave, a young man, of the Dog-rib nation, whom he had taken by force from his friends; when he thought himself, however, out of reach of our observation, he laid aside a good deal of his state, and assisted in the labour; and, after a few days' further acquaintance with us, he did not hesitate to paddle in our presence, or even carry his canoe on the portages. Several of the canoes were managed by women, who proved to be noisy companions, for they quarrelled frequently, and the weakest was generally profuse in her lamentations, which were not at all diminished, when the husband attempted to settle the difference by a few blows with his paddle.

An observation, near the centre of the lake, gave 114° 13′ 39″ W., and 33° 8′ 06″ E. variation.

Leaving the lake, we ascended a very strong rapid, and arrived at a range of three steep cascades, situated in the bend of the river. Here we made a portage of one thousand three hundred yards over a rocky hill, which received the name of the Bowstring Portage, from its shape. We found that the Indians had greatly the advantage of us in this operation; the men carried their small canoes, the women and children the clothes and provisions, and at the end of the portage they were ready to embark; whilst it was necessary for our people to return four times, before they could transport the weighty cargo with which we were burthened. After passing through another expansion of the river, and over the steep portage of one hundred and fifteen yards, we encamped on a small rocky isle, just large enough to hold our party, and the Indians took possession of an adjoining rock. We were now distant thirty miles from Fort Providence.

As soon as the tents were pitched, the officers and men were divided into watches for the night; a precaution intended to be taken throughout the journey, not merely to prevent our being surprised by strangers, but also to show our companions that we were constantly on our guard. The chief, who suffered nothing to escape his observation, remarked, "that he should sleep without anxiety among the Esquimaux, for he perceived no enemy could surprise us."

After supper we retired to rest, but our sleep was soon interrupted by the Indians joining in loud lamentations over a sick child, whom they supposed to be dying. Dr. Richardson, however, immediately went to the boy, and administered some medicine which relieved his pain, and put a stop to their mourning. The temperatures, this day, were at four A.M. 54°, three P.M. 72°, at seven P.M. 65°.

On the 4th we crossed a small lake, and passed over in succession the Blue Berry Cascade, and Double Fall portages, where the river falls over ridges of rocks that completely obstruct the passage for canoes. We came to three strong rapids beyond these barriers, which were surmounted by the aid of the poles and lines, and then to a bend of the river in which the cascades were so frequent, that to avoid them we carried the canoes into a chain of small lakes. We entered them by a portage of nine hundred and fifty paces, and during the afternoon traversed three other grassy lakes, and encamped on the banks of the river, at the end of the Yellow-Knife Portage, of three hundred and fifty paces. This day's work was very laborious to our men. Akaitcho, however, had directed his party to assist them in carrying their burdens on the portages, which they did cheerfully. This morning Mr. Back caught several fish with a fly, a method of fishing entirely new to the Indians; and they were not more delighted than astonished at his skill and success. The extremes of temperature to-day were 54° and 65°.

On August 5th we continued the ascent of the river which varied

much in breadth as did the current in rapidity. It flows between high rocky banks on which there is sufficient soil to support pines, birch, and poplars. Five portages were crossed, then the Rocky Lake, and we finished our labours at the end of the sixth portage. The issue of dried meat for breakfast this morning had exhausted all our stock; and no other provision remained but the portable soups, and a few pounds of preserved meat. At the recommendation of Akaitcho, the hunters were furnished with ammunition, and desired to go forward as speedily as possible, to the part where the rein-deer were expected to be found; and to return to us with any provision they could procure. He also assured us that in our advance towards them we should come to lakes abounding in fish. Many of the Indians, being also in distress for food, decided on separating from us, and going on at a quicker pace than we could travel.

Akaitcho himself was always furnished with a portion at our meals, as a token of regard which the traders have taught the chiefs to expect, and which we willingly paid.

The next morning we crossed a small lake and a portage, before we entered the river; shortly afterwards, the canoes and cargoes were carried a mile along its banks, to avoid three very strong rapids, and over another portage into a narrow lake; we encamped on an island in the middle of it, to set the nets; but they only yielded a few fish, and we had a very scanty supper; as it was necessary to deal out our provision sparingly. The longitude 114° 27′ 03″ W., and variation 33° 04″ E., were observed.

We had the mortification of finding the nets entirely empty next morning, an untoward circumstance that discouraged our voyagers very much; and they complained of being unable to support the fatigue to which they were daily exposed, on their present scanty fare. We had seen with regret that the portages were more frequent as we advanced to the northward, and feared that their strength would

fail, if provision were not soon obtained. We embarked at six, proceeded to the head of the lake, and crossed a portage of two thousand five hundred paces, leading over ridges of sand-hills, which nourished pines of a larger size than we had lately seen. This conducted us to Mossy Lake, from whence we regained the river, after traversing another portage. The Birch and Poplar portages next followed, and beyond these we came to a part where the river takes a great circuit, and its course is interrupted by several heavy falls. The guide, therefore, advised us to quit it, and proceed through a chain of nine lakes extending to the north-east, which we did, and encamped on Icy Portage, where the nets were set. The bottom of the valley, through which the track across this portage led, was covered with ice four or five feet thick, the remains of a large iceberg, which is annually formed there, by the snow drifting into the valley, and becoming consolidated into ice by the overflowing of some springs that are warm enough to resist the winter's cold. The latitude is 63° 22′ 15″ N., longitude 114° 15′ 30″ W.

We were alarmed in the night by our fire communicating to the dry moss, which spreading by the force of a strong wind, encircled the encampment and threatened destruction to our canoes and baggage. The watch immediately aroused all the men, who quickly removed whatever could be injured to a distant part, and afterwards succeeded in extinguishing the flame.

August 8.—During this day we crossed five portages, passing over a very bad road. The men were quite exhausted with fatigue by five P.M., when we were obliged to encamp on the borders of the fifth lake, in which the fishing-nets were set. We began this evening to issue some portable soup and arrow-root, which our companions relished very much; but this food is too unsubstantial to support their vigour under their daily exhausting labour, and we could not furnish them with a sufficient quantity even of this to satisfy their desires. We commenced our labours on the next day in a very

wet uncomfortable state, as it had rained through the night until four A.M. The fifth grassy lake was crossed, and four others, with their intervening portages, and we returned to the river by a portage of one thousand four hundred and fifteen paces. The width of the stream here is about one hundred yards, its banks are moderately high, and scantily covered with wood. We afterwards twice carried the cargoes along its banks to avoid a very stoney rapid, and then crossed the first Carp portage in longitude 114° 2′ 01″ W., variation of the compass 32° 30′ 40″ E., and encamped on the borders of Lower Carp Lake.

The chief having told us that this was a good lake for fishing, we determined on halting for a day or two to recruit our men, of whom three were lame, and several others had swelled legs. The chief himself went forward to look after the hunters, and he promised to make a fire as a signal if they had killed any rein-deer. All the Indians had left us in the course of yesterday and to-day to seek these animals, except the guide Keskarrah.

August 10.—The nets furnishing only four carp, we embarked for the purpose of searching for a better spot, and encamped again on the shores of the same lake. The spirits of the men were much revived by seeing some recent traces of rein-deer at this place, which circumstance caused them to cherish the hope of soon getting a supply of meat from the hunters. They were also gratified by finding abundance of blue berries near to the encampment, which made an agreeable and substantial addition to their otherwise scanty fare. We were teazed by sand-flies this evening, although the thermometer did not rise above 45°. The country through which we have travelled for some days consists principally of granite, intermixed in some spots with mica slate, often passing into clay-slate. But the borders of Lower Carp Lake, where the gneiss formation prevails, are composed of hills, having less altitude, fewer precipices, and more rounded summits. The valleys are less fertile, containing a gra-

velly soil and fewer trees; so that the country has throughout a more barren aspect.

August 11.—Having caught sufficient trout, white fish, and carp, yesterday and this morning, to afford the party two hearty meals, and the men being recovered of their fatigue, we proceeded on our journey, crossed the Upper Carp Portage, and embarked on the lake of that name, where we had the gratification of paddling for ten miles. We put up at its termination to fish, by the advice of our guide, and the following observations were then taken: longitude 113° 46′ 35″ W., variation of the compass 36° 45′ 30″ E., dip 87° 11′ 48″. At this place we first perceived the north end of our dipping-needle to pass the perpendicular line when the instrument was faced to the west.

We had scarcely quitted the encampment next day before an Indian met us, with the agreeable communication, that the hunters had made several fires, which were certain indications of their having killed rein-deer. This intelligence inspired our companions with fresh energy, and they quickly traversed the next portage, and paddled through the Rein-deer Lake; at the north side of it we found the canoes of our hunters, and learned from our guide, that the Indians usually leave their canoes here, as the water-communication on their hunting-grounds is bad. The Yellow-Knife River has now dwindled into an insignificant rivulet, and we could not trace it beyond the next lake, except as a mere brook. The latitude of its source 64° 1′ 30″ N., longitude 113° 36′ W., and its length is one hundred and fifty-six statute miles. Though this river is of sufficient breadth and depth for navigating in canoes, yet I conceive its course is too much interrupted by cascades and rapids for its ever being used as a channel for the conveyance of merchandise. Whilst the crews were employed in making a portage over the foot of Prospect Hill, we ascended to the top of it, and as it is the highest ground in the neighbourhood, its summit, which is about five hundred feet above the water, commands an extensive view.

Akaitcho, who was here with his family, pointed out to us the smoke of the distant fires which the hunters had made. The prospect from the hill is agreeably diversified by an intermixture of hill and valley, and the appearance of twelve lakes in different directions. On the borders of these lakes a few thin pine groves occur, but the country in general is destitute of almost every vegetable, except a few berry-bearing shrubs and lichens, and has a very barren aspect. The hills are composed of gneiss, but their acclivities are covered with a coarse gravelly soil. There are many large loose stones both on their summits and acclivities, composed of the same materials as the solid rock.

We crossed another lake in the evening, encamped, and set the nets. The chief made a large fire to announce our situation to the hunters.

August 13.—We caught twenty fish this morning, but they were small, and furnished but a scanty breakfast for the party. Whilst this meal was preparing, our Canadian voyagers, who had been for some days past murmuring at their meagre diet, and striving to get the whole of our little provision to consume at once, broke out into open discontent, and several of them threatened they would not proceed forward unless more food was given to them. This conduct was the more unpardonable, as they saw we were rapidly approaching the fires of the hunters, and that provision might soon be expected. I, therefore, felt the duty incumbent on me to address them in the strongest manner on the danger of insubordination, and to assure them of my determination to inflict the heaviest punishment on any that should persist in their refusal to go on, or in any other way attempt to retard the Expedition. I considered this decisive step necessary, having learned from the gentlemen, most intimately acquainted with the character of the Canadian voyagers, that they invariably try how far they can impose upon every new master with whom they may serve, and that they will continue to be

disobedient and intractable if they once gain any ascendency over him. I must admit, however, that the present hardships of our companions were of a kind which few could support without murmuring, and no one could witness without feeling a sincere pity for their sufferings.

After this discussion we went forward until sun-set. In the course of the day we crossed seven lakes and as many portages. Just as we had encamped we were delighted to see four of the hunters arrive, with the flesh of two rein-deer. This seasonable supply, though only sufficient for this evening's and the next day's consumption, instantly revived the spirits of our companions, and they immediately forgot all their cares. As we did not, after this period, experience any deficiency of food during this journey, they worked extremely well, and never again reflected upon us as they had done before, for rashly bringing them into an inhospitable country, where the means of subsistence could not be procured.

Several blue fish, resembling the grayling, were caught in a stream which flows out of Hunter's Lake. It is remarkable for the largeness of the dorsal fin and the beauty of its colours.

August 14.—Having crossed the Hunter's Portage we entered the lake of the same name in latitude 64° 6′ 47″ N. longitude, 113° 25′ 00″ W., but soon quitted it by desire of the Indian guide, and diverged more to the eastward that we might get into the line upon which our hunters had gone. This was the only consideration that could have induced us to remove to a chain of small lakes connected by long portages. We crossed three of these, and then were obliged to encamp to rest the men. The country is bare of wood except a few dwarf birch bushes, which grow near the borders of the lakes, and here and there a few stunted pines; and our fuel principally consisted of the roots of decayed pines, which we had some difficulty to collect in sufficient quantity for cooking. When this material is wanting, the rein-deer lichen and other mosses that grow in profusion

on the gravelly acclivities of the hills are used as substitutes. Three more of the hunters arrived with meat this evening, which supply came very opportunely as our nets were unproductive. At eight P.M. a faint Aurora Borealis appeared to the southward, the night was cold, the wind strong from N.W.

We were detained some time in the following morning before the fishing-nets, which had sunk in the night, could be recovered.

After starting we first crossed the Orkney Lake, then a portage which brought us to Sandy Lake, and here we missed one of our barrels of powder, which the steersman of the canoe then recollected had been left yesterday. He and two other men were sent back to search for it, in the small canoe. The rest of the party proceeded to the portage on the north side of the Grizzle-Bear Lake, where the hunters had made a deposit of meat, and there encamped to await their return, which happened at nine P.M. with the powder. We perceived, from the direction of this lake, that considerable labour would have been spared if we had continued our course yesterday instead of striking off at the guide's suggestion, as the bottom of this lake cannot be far separated from either Hunter's Lake or the one to the westward of it. The chief and all the Indians went off to hunt, accompanied by Pierre St. Germain, the interpreter. They returned at night bringing some meat, and reported that they had put the carcasses of several rein-deer *en cache*. These were sent for early next morning, and as the weather was unusually warm, the thermometer, at noon, being 77°, we remained stationary all day, that the women might prepare the meat for keeping, by stripping the flesh from the bones and drying it in the sun over a slow fire. The hunters were again successful, and by the evening we had collected the carcasses of seventeen deer. As this was a sufficient store to serve us until we arrived at Winter Lake, the chief proposed that he and his hunters should proceed to that place and collect some provision against our arrival. He also requested that we would

allow him to be absent ten days to provide his family with clothing, as the skin of the rein-deer is unfit for that purpose after the month of September. We could not refuse to grant such a reasonable request, but caused St. Germain to accompany him, that his absence might not exceed the appointed time. Previous to his departure the chief warned us to be constantly on our guard against the grizzly bears, which he described as being numerous in this vicinity, and very ferocious; one had been seen to-day by an Indian, to which circumstance the lake owes its appellation. We afterwards learned that the only bear in this part of the country is the brown bear, and that they by no means possess the ferocity which the Indians ascribe to them with their usual love of exaggeration. The fierce grizzly bear, which frequents the sources of the Missouri, is not found on the barren grounds.

The shores of this lake and the neighbouring hills are principally composed of sand and gravel; they are much varied in their outline and present some picturesque scenery.

The following observations were taken here: latitude 64° 15′ 17″ N.; longitude 113° 2′ 39″ W.; variation of the compass 36° 50′ 47″ E.; and dip of the needle 87° 20′ 35″.

On August the 17th, having finished drying the meat, which had been retarded by the heavy showers of rain that fell in the morning, we embarked at one P.M. and crossed two lakes and two portages. The last of these was two thousand and sixty-six paces long, and very rugged, so that the men were much fatigued. On the next day we received the flesh of four rein-deer by the small canoe which had been sent for it yesterday, and heard that the hunters had killed several more deer on our route. We saw many of these animals as we passed along to-day; and our companions, delighted with the prospect of having food in abundance, now began to accompany their paddling with singing, which they had discontinued ever since our provisions became scarce. We passed

from one small lake to another over four portages, then crossed a lake about six miles in diameter, and encamped on its border, where, finding pines, we enjoyed the luxury of a good fire, which we had not done for some days. At ten P.M. the aurora borealis appeared very brilliant in an arch across the zenith, from north-west to south-east, which afterwards gave place to a beautiful corona borealis.

August 19.—After crossing a portage of five hundred and ninety-five paces, a small lake and another portage of two thousand paces, which occupied the crews seven hours, we embarked on a small stream, running towards the north-west, which carried us to the lake, where Akaitcho proposed that we should pass the winter. The officers ascended several of the loftiest hills in the course of the day, prompted by a natural anxiety to examine the spot which was to be their residence for many months. The prospect, however, was not then the most agreeable, as the borders of the lake seemed to be scantily furnished with wood, and that of a kind too small for the purposes of building.

We perceived the smoke of a distant fire which the Indians suppose had been made by some of the Dog-ribbed tribe, who occasionally visit this part of the country.

Embarking at seven next morning, we paddled to the western extremity of the lake, and there found a small river, which flows out of it to the S.W. To avoid a strong rapid at its commencement, we made a portage, and then crossed to the north bank of the river, where the Indians recommended that the winter establishment should be erected, and we soon found that the situation they had chosen possessed all the advantages we could have desired. The trees were numerous, and of a far greater size than we had supposed them to be yesterday. Some of the pines being thirty or forty feet high, and two feet in diameter at the root. We determined on placing the house on the summit of the bank, which commands a beautiful prospect of the surrounding country. The

view in the front is bounded at the distance of three miles, by round-backed hills; to the eastward and westward lie the Winter and Round-rock Lakes, which are connected by the Winter River, whose banks are well clothed with pines, and ornamented with a profusion of mosses, lichens, and shrubs.

In the afternoon we read divine service, and offered our thanksgiving to the Almighty for his goodness in having brought us thus far on our journey; a duty which we never neglected, when stationary on the sabbath.

The united length of the portages we have crossed, since leaving Fort Providence, is twenty-one statute miles and a half; and as our men had to traverse each portage four times, with a load of one hundred and eighty pounds, and return three times light, they walked in the whole upwards of one hundred and fifty miles. The total length of our voyage from Chipewyan is five hundred and fifty-three miles *.

A fire was made on the south side of the river to inform the chief of our arrival, which spreading before a strong wind, caught the whole wood, and we were completely enveloped in a cloud of smoke for the three following days.

On the next morning our voyagers were divided into two parties, the one to cut the wood for the building of a store-house, and the other to fetch the meat as fast as the hunters procured it. An interpreter was sent with Keskarrah, the guide, to search for the Indians who had made the fire seen on Saturday, from whom we

	Statute Miles.
* Stoney and Slave Rivers	260
Slave Lake	107
Yellow-Knife River	156.5
Barren country between the source of the Yellow-Knife River and Fort Enterprise	29.5
	553

might obtain some supplies of provision. An Indian was also despatched to Akaitcho, with directions for him to come hither directly, and bring whatever provision he had, as we were desirous of proceeding, without delay, to the Copper-Mine River. In the evening our men brought in the carcasses of seven rein-deer, which two hunters had shot yesterday, and the women commenced drying the meat for our journey. We also obtained a good supply of fish from our nets to-day.

A heavy rain, on the 23d, prevented the men from working, either at the building, or going for meat; but on the next day the weather was fine, and they renewed their labours. The thermometer, that day, did not rise higher than 42°, and it fell to 31° before midnight. On the morning of the 25th, we were surprised by some early symptoms of the approach of winter; the small pools were frozen over, and a flock of geese passed to the southward. In the afternoon, however, a fog came on, which afterwards changed into rain, and the ice quickly disappeared. We suffered great anxiety all the next day respecting John Hepburn, who had gone to hunt before sunrise on the 25th, and been absent ever since. About four hours after his departure the wind changed, and a dense fog obscured every mark by which his course to the tents could be directed, and we thought it probable he had been wandering in an opposite direction to our situation, as the two hunters, who had been sent to look for him, returned at sunset without having seen him. Akaitcho arrived with his party, and we were greatly disappointed at finding they had stored up only fifteen rein-deer for us. St. Germain informed us, that having heard of the death of the chief's brother-in-law, they had spent several days in bewailing his loss, instead of hunting. We learned also, that the decease of this man had caused another party of the tribe, who had been sent by Mr. Wentzel to prepare provision for us on the banks of the Copper-Mine River, to remove to the shores of the Great Bear Lake, distant from our

proposed route. Mortifying as these circumstances were, they produced less painful sensations than we experienced in the evening, by the refusal of Akaitcho to accompany us in the proposed descent of the Copper-Mine River. When Mr. Wentzel, by my direction, communicated to him my intention of proceeding at once on that service, he desired a conference with me upon the subject, which being immediately granted, he began by stating, that the very attempt would be rash and dangerous, as the weather was cold, the leaves were falling, some geese had passed to the southward, and the winter would shortly set in; and that, as he considered the lives of all who went on such a journey would be forfeited, he neither would go himself, nor permit his hunters to accompany us. He said there was no wood within eleven days' march, during which time we could not have any fire, as the moss, which the Indians use in their summer excursions, would be too wet for burning, in consequence of the recent rains; that we should be forty days in descending the Copper-Mine River, six of which would be expended in getting to its banks, and that we might be blocked up by the ice in the next moon; and during the whole journey the party must experience great suffering for want of food, as the rein-deer had already left the river.

He was now reminded that these statements were very different from the account he had given, both at Fort Providence and on the route hither; and that, up to this moment, we had been encouraged by his conversation to expect that the party might descend the Copper-Mine River, accompanied by the Indians. He replied, that at the former place he had been unacquainted with our slow mode of travelling, and that the alteration, in his opinion, arose from the advance of winter.

We now informed him, that we were provided with instruments by which we could ascertain the state of the air and water, and that we did not imagine the winter to be so near as he supposed; how-

ever, we promised to return on discovering the first change in the season. He was also told that all the baggage being left behind, our canoes, would now, of course, travel infinitely more expeditiously than any thing he had hitherto witnessed. Akaitcho appeared to feel hurt, that we should continue to press the matter further, and answered with some warmth: "Well, I have said every thing I can urge, to dissuade you from going on this service, on which, it seems, you wish to sacrifice your own lives, as well as the Indians who might attend you: however, if after all I have said, you are determined to go, some of my young men shall join the party, because it shall not be said, that we permitted you to die alone after having brought you hither; but from the moment they embark in the canoes, I and my relatives shall lament them as dead."

We could only reply to this forcible appeal, by assuring him and the Indians who were seated around him, that we felt the most anxious solicitude for the safety of every individual, and that it was far from our intention to proceed without considering every argument for and against the proposed journey.

We next informed him, that it would be very desirable to see the river at any rate, that we might give some positive information about its situation and size, in our next letters to the great Chief; and that we were very anxious to get on its banks, for the purpose of observing an eclipse of the sun, which we described to him, and said would happen in a few days. He received this communication with more temper than the preceding, though he immediately assigned as a reason for his declining to go, that "the Indians must now procure a sufficient quantity of deer-skins for winter clothing for themselves, and dresses for the Canadians, who would need them if they had to travel in the winter." Finding him so averse to proceed, and feeling at the same time, how essential his continuance with us was, not only to our future success, but even to our existence during the winter; I closed the conversation here, intending to propose to

him next morning, some modification of the plan, which might meet his approbation. Soon after we were gone, however, he informed Mr. Wentzel, with whom he was in the habit of speaking confidentially, that as his advice was neglected, his presence was useless, and he should, therefore, return to Fort Providence with his hunters, after he had collected some winter provision for us. Mr. Wentzel having reported this to me, the night was past in great anxiety, and after weighing all the arguments that presented themselves to my mind, I came reluctantly to the determination of relinquishing the intention of going any distance down the river this season. I had considered, that could we ascertain what were the impediments to the navigation of the Copper-Mine River, what wood grew on its banks, if fit for boat-building, and whether drift timber existed where the country was naked, our operations next season would be much facilitated; but we had also cherished the hope of reaching the sea this year, for the Indians in their conversations with us, had only spoken of two great rapids as likely to obstruct us. This was a hope extremely painful to give up, for in the event of success we should have ascertained whether the sea was clear of ice, and navigable for canoes; have learned the disposition of the Esquimaux; and might have obtained other information that would have had great influence on our future proceedings.

I must confess, however, that my opinion of the probability of our being able to attain so great a desideratum this season had been somewhat altered by the recent changes in the weather, although, had the chief been willing to accompany us with his party, I should have made the attempt; with the intention, however, of returning immediately upon the first decided appearance of winter.

On the morning of August 27th, having communicated my sentiments to the officers, on the subject of the conference last evening, they all agreed that the descent to the sea this season could not be

attempted, without hazarding a complete rupture with the Indians; but they thought that a party should be sent to ascertain the distance and size of the Copper-Mine River. These opinions being in conformity with my own, I determined on despatching Messrs. Back and Hood on that service, in a light canoe, as soon as possible.

We witnessed this morning an instance of the versatility of our Indian companions, which gave us much uneasiness, as it regarded the safety of our faithful attendant Hepburn. When they heard, on their arrival last night, of his having been so long absent, they expressed the greatest solicitude about him, and the whole party immediately volunteered to go in search of him as soon as daylight permitted. Their resolutions, however, seemed to have been changed, in consequence of the subsequent conversation we had with the chief, and we found all of them indisposed to proceed on that errand this morning, and it was only by much entreaty, that three of the hunters and a boy were prevailed upon to go. They fortunately succeeded in their search, and we were infinitely rejoiced to see Hepburn return with them in the afternoon, though much jaded by the fatigue he had undergone. He had got bewildered, as we had conjectured, in the foggy weather on the 25th, and had been wandering about ever since, except during half an hour that he slept yesterday. He had eaten only a partridge and some berries, for his anxiety of mind had deprived him of appetite; and of a deer which he had shot, he took only the tongue, and the skin to protect himself from the wind and rain. This anxiety we learned from him was occasioned by the fear that the party which was about to descend the Copper-Mine River, might be detained until he was found, or that it might have departed without him. He did not entertain any dread of the white bears, of whose numbers and ferocious attacks the Indians had been constantly speaking, since we had entered the barren grounds. Our fears for his safety, however, were

in a considerable degree excited by the accounts we had received of these animals. Having made a hearty supper he retired to rest, slept soundly, and arose next morning in perfect health.

On the 28th of August Akaitcho was informed of our intention to send the party to the river, and of the reasons for doing so, of which he approved, when he found that I had relinquished the idea of going myself, in compliance with the desire which he and the Indians had expressed; and he immediately said two of the hunters should go to provide them with food on the journey, and to serve as guides. During this conversation we gathered from him, for the first time, that there might still be some of his tribe near to the river, from whom the party could get provision. Our next object was to despatch the Indians to their hunting-ground to collect provision for us, and to procure the fat of the deer for our use during the winter, and for making the pemmican we should require in the spring. They were therefore furnished with some ammunition, clothing, and other necessary articles, and directed to take their departure as soon as possible.

Akaitcho came into our tent this evening at supper, and made several pertinent inquiries respecting the eclipse, of which we had spoken last night. He desired to know the effect that would be produced, and the cause of it, which we endeavoured to explain; and, having gained this information, he sent for several of his companions, that they might also have it repeated to them. They were most astonished at our knowing the time at which this event should happen, and remarked, that this knowledge was a striking proof of the superiority of the whites over the Indians. We took advantage of this occasion to speak to them respecting the Supreme Being, who ordered all the operations of nature, and to impress on their minds the necessity of paying strict attention to their moral duties, in obedience to his will. They readily assented to all these points, and Akaitcho assured us that both himself and his young men would

exert themselves in obtaining provision for us in return for the interesting communications we had just made to them.

Having received a supply of dried meat from the Indian lodges, we were enabled to equip the party for the Copper-Mine River, and at nine A.M., on the 29th, Mr. Back and Mr. Hood embarked on that service in a light canoe, with St. Germain, eight Canadians, and one Indian. We could not furnish them with more than eight days' provision, which, with their blankets, two tents, and a few instruments, composed their lading. Mr. Back, who had charge of the party, was directed to proceed to the river, and if, when he arrived at its banks, the weather should continue to be mild, and the temperature of the water was not lower than 40°, he might embark, and descend the stream for a few days, to gain some knowledge of its course, but he was not to go so far as to risk his returning to this place in a fortnight with the canoe. But, if the weather should be severe, and the temperature of the water below 40°, he was not to embark, but return immediately, and endeavour to ascertain the best track for our goods to be conveyed thither next spring.

We had seen that the water decreases rapidly in temperature at this season, and I feared that, if he embarked to descend the river when it was below 40°, the canoe might be frozen in, and the crew have to walk back in very severe weather.

As soon as the canoes had started, Akaitcho and the Indians took their departure also, except two of the hunters, who staid behind to kill deer in our neighbourhood, and old Keskarrah and his family, who remained as our guests.

The fishing-nets were this day transferred from the river in which they had been set since our arrival, to Winter Lake, whither the fish had removed, and the fishermen built a log-hut on its borders to reside in, that they might attend more closely to their occupation.

The month of September commenced with very disagreeable weather. The temperature of the atmosphere ranged between 39° and

31° during the first three days, and that of the water in the river decreased from 49° to 44°. Several rein-deer and a large flight of white geese passed to the southward. These circumstances led us to fear for the comfort, if not for the safety, of our absent friends. On the 4th of September we commenced building our dwelling-house, having cut sufficient wood for the frame of it.

In the afternoon of September the 6th, we removed our tent to the summit of a hill, about three miles distant, for the better observing the eclipse, which was calculated to occur on the next morning. We were prevented, however, from witnessing it by a heavy snow-storm, and the only observation we could then make was to examine whether the temperature of the atmosphere altered during the eclipse, but we found that both the mercurial and spirit thermometers remained steadily at 30° for a quarter of an hour previous to its commencement, during its continuance, and for half an hour subsequent to its termination; we remarked the wind increased very much, and the snow fell in heavier flakes just after the estimated time of its commencement. This boisterous weather continued until three P.M., when the wind abated, and the snow changed to rain.

As there was now no immediate occasion for my remaining on the spot, the eclipse being over, and the Indians having removed to their hunting-grounds, Dr. Richardson and I determined on taking a pedestrian excursion to the Copper-Mine River, leaving Mr. Wentzel in charge of the men, and to superintend the buildings. On the morning of September the 9th we commenced our journey, under the guidance of old Keskarrah, and accompanied by John Hepburn and Samandrie, who carried our blankets, cooking utensils, hatchets, and a small supply of dried meat. Our guide led us from the top of one hill to the top of another, making as straight a course to the northward as the numerous lakes, with which the country is intersected, would permit. At noon we reached a remarkable hill, with precipitous sides, named by the Copper Indians the Dog-rib Rock,

and its latitude, 64° 34′ 52″ S., was obtained. The canoe-track passes to the eastward of this rock, but we kept to the westward, as being the more direct course. From the time we quitted the banks of Winter River we saw only a few detached clumps of trees; but after we passed Dog-rib Rock even these disappeared, and we travelled through a naked country. In the course of the afternoon Keskarrah killed a rein-deer, and loaded himself with its head and skin, and our men also carried off a few pounds of its flesh for supper; but their loads were altogether too great to permit them to take much additional weight. Keskarrah offered to us as a great treat the raw marrow from the hind legs of the animal, of which all the party ate except myself, and thought it very good. I was also of the same opinion, when I subsequently conquered my then too fastidious taste. We halted for the night on the borders of a small lake, which washed the base of a ridge of sand-hills, about three hundred feet high, having walked in direct distance sixteen miles.

There were four ancient pine-trees here which did not exceed six or seven feet in height, but whose branches spread themselves out for several yards, and we gladly cropped a few twigs to make a bed and to protect us from the frozen ground, still white from a fall of snow which took place in the afternoon. We were about to cut down one of these trees for firewood, but our guide solicited us to spare them, and made us understand by signs that they had been long serviceable to his nation, and that we ought to content ourselves with a few of the smaller branches. As soon as we comprehended his request we complied with it, and our attendants having, with some trouble, grubbed up a sufficient quantity of the roots of the dwarf birch to make a fire, we were enabled to prepare a comfortable supper of rein-deer's meat, which we despatched with the appetites travelling in this country never fails to ensure. We then stretched ourselves out on the pine brush, and covered by a single blanket, enjoyed a night of sound repose. The small quantity of bed-clothes

we carried induced us to sleep without undressing. Old Keskarrah followed a different plan; he stripped himself to the skin, and having toasted his body for a short time over the embers of the fire, he crept under his deer-skin and rags, previously spread out as smoothly as possible, and coiling himself up in a circular form, fell asleep instantly. This custom of undressing to the skin even when lying in the open air is common to all the Indian tribes. The thermometer at sun-set stood at 29°.

Resuming our journey next morning we pursued a northerly course, but had to make a considerable circuit round the western ends of two lakes whose eastern extremities were hidden from our view. The march was very uncomfortable as the wind was cold, and there was a constant fall of snow until noon; our guide too persisted in taking us over the summit of every hill that lay in the route, so that we had the full benefit of the breeze.

We forded two streams in the afternoon flowing between small lakes, and being wet, did not much relish having to halt, whilst Keskarrah pursued a herd of rein-deer; but there was no alternative, as he set off and followed them without consulting our wishes. The old man loaded himself with the skin, and some meat of the animal he killed in addition to his former burden; but after walking two miles, finding his charge too heavy for his strength, he spread the skin on the rock, and deposited the meat under some stones, intending to pick them up on our return.

We put up at sunset on the borders of a large lake, having come twelve miles. A few dwarf birches afforded us but a scanty fire, yet being sheltered from the wind by a sandy bank, we passed the night comfortably, though the temperature was 30°. A number of geese passed over us to the southward. We set off early next morning, and marched at a tolerably quick pace. The atmosphere was quite foggy, and our view was limited to a short distance. At noon, the sun shone forth for a few minutes, and the latitude 64° 57′ 7″

was observed. The small streams that we have hitherto crossed run uniformly to the southward.

At the end of sixteen miles and a half we encamped amongst a few dwarf pines, and were much rejoiced at having a good fire, as the night was very stormy and cold. The thermometer fluctuated this day between 31° and 35°. Though the following morning was foggy and rainy, we were not sorry to quit the cold and uncomfortable beds of rock upon which we had slept, and commence our journey at an early hour. After walking about three miles, we passed over a steep sandy ridge, and found the course of the rivulets running towards the north and north-west. Our progress was slow in the early part of the morning, and we were detained for two hours on the summit of a hill exposed to a very cold wind, whilst our guide went in an unsuccessful pursuit of some rein-deer. After walking a few miles farther, the fog cleared away, and Keskarrah pointed out the Copper-Mine River at a distance, and we pushed towards it with all the speed we could put forth. At noon we arrived at an arm of Point Lake, an extensive expansion of the river, and observed the latitude 65° 9′ 06″ N. We continued our walk along the south end of this arm for about a mile further, and then halted to breakfast amidst a cluster of pines. Here the longitude, 112° 57′ 25″, was observed. After breakfast we set out and walked along the east-side of the arm towards the main body of the lake, leaving Samandrie to prepare an encampment amongst the pines against our return. We found the main channel deep, its banks high and rocky, and the valleys on its borders interspersed with clusters of spruce trees. The latter circumstance was a source of much gratification to us. The temperature of its surface water was 41°, that of the air being 43°. Having gained all the information we could collect from our guide and from personal observation, we retraced our steps to the encampment; and on the way back Hep-

burn and Keskarrah shot several waveys (*anas hyperborea,*) which afforded us a seasonable supply, our stock of provision being nearly exhausted. These birds were feeding in large flocks on the crow-berries, which grew plentifully on the sides of the hills. We reached the encampment after dark, found a comfortable hut prepared for our reception, made an excellent supper, and retired to bed, and slept soundly though it snowed hard the whole night.

The hills in this neighbourhood are higher than those about Fort Enterprise; they stand, however, in the same detached manner, without forming connected ranges; and the bottom of every valley is occupied, either by a small lake or a stoney marsh. On the borders of such of these lakes as communicate with the Copper-Mine River, there are a few groves of spruce trees, generally growing on accumulations of sand, on the acclivities of the hills.

We did not quit the encampment on the morning of September 13th until nine o'clock, in consequence of a constant fall of snow; but at that hour we set out on our return to Fort Enterprise, and taking a route somewhat different from the one by which we came, kept to the eastward of a chain of lakes. Soon after noon the weather became extremely disagreeable; a cold northerly gale came on, attended by snow and sleet; and the temperature fell very soon from 43° to 34°. The waveys, alarmed at the sudden change, flew over our heads in great numbers to a milder climate. We walked as quickly as possible to get to a place that would furnish some fuel and shelter; but the fog occasioned us to make frequent halts, from the inability of our guide to trace his way. At length we came to a spot which afforded us plenty of dwarf birches, but they were so much frozen, and the snow fell so thick, that upwards of two hours were wasted in endeavouring to make a fire; during which time our clothes were freezing upon us. At length our efforts were crowned with success, and after a good supper, we laid, or rather sat down to

Drawn by Lieut. Back R.N.

Engraved by Edw.d Finden.

MARTEN LAKE. 1820.

sleep; for the nature of the ground obliged us to pass the night in a demi-erect position, with our backs against a bank of earth. The thermometer was 16° at six P.M.

After enjoying a more comfortable night's rest than we had expected, we set off at day-break: the thermometer then standing at 18°. The ground was covered with snow, the small lakes were frozen, and the whole scene had a wintry appearance. We got on but slowly at first, owing to an old sprained ancle, which had been very troublesome to me for the last three days, and was this morning excessively painful. In fording a rivulet, however, the application of cold water gave me immediate relief, and I walked with ease the remainder of the day. In the afternoon we rejoined our track outwards and came to the place where Keskarrah had made his deposit of provision, which proved a very acceptable supply, as our stock was exhausted. We then crossed to some sand hills, and encamped amidst a few small pines, having walked thirteen miles.

The comfort of a good fire made us soon insensible to the fatigue we had experienced through the day, in marching over the rugged stones, whose surface was rendered slippery by the frost. The thermometer at seven P.M. stood at 27°.

We set off at sunrise next morning, and our provision being expended pushed on as fast as we could to Fort Enterprise, where we arrived at eight P.M., almost exhausted by a harassing day's march of twenty-two miles. A substantial supper of rein-deer steaks soon restored our vigour. We had the happiness of meeting our friends Mr. Back and Mr. Hood, who had returned from their excursion on the day succeeding that on which we set out; and I received from them the following account of their journey.

They proceeded up the Winter River to the north end of the Martin Lake, and then the guide, being unacquainted with the route by water to the Copper-Mine River, proposed that the canoe should be left. Upon this they ascended the loftiest hill in the

neighbourhood, to examine whether they could discover any large lakes, or water communication in the direction which the guide pointed the river to be. They only saw a small rivulet, which was too shallow for the canoe, and also wide of the course; and as they perceived the crew would have to carry it over a rugged hilly track, they judiciously decided on leaving it, and proceeding forwards on foot. Having deposited the canoe among a few dwarf birch bushes, they commenced their march, carrying the tents, blankets, cooking utensils, and a part of the dried meat. St. Germain, however, had previously delineated with charcoal, a man and a house on a piece of bark, which he placed over the canoe and the few things that were left, to point out to the Dog-Ribs that they belonged to white people.

The party reached the shores of Point Lake, through which the Copper-Mine River runs, on the 1st of September. The next day was too stormy for them to march, but on the 3d, they proceeded along its shore to the westward, round a mountainous promontory, and perceiving the course of the lake extending to the W.N.W., they encamped near some pines, and then first enjoyed the luxury of a good fire, since their departure from us. The temperature of the water in the lake was 35°, and of the air 32°, but the latter fell to 20° in the course of that night. As their principal object was to ascertain whether any arm of the lake branched nearer to Fort Enterprise than the part they had fallen upon, to which the transport of our goods could be more easily made next spring, they returned on its borders to the eastward, being satisfied, by the appearance of the mountains between south and west, that no further examination was necessary in that direction; and they continued their march until the 6th at noon, without finding any part of the lake inclining nearer to the fort. They therefore encamped to observe the eclipse, which was to take place on the following morning; but a violent snow storm rendering the observation impossible, they commenced

their return, and after a comfortless and laborious march regained their canoe on the 10th, and embarking in it, arrived the same evening at the house.

Point Lake varied, as far as they traced, from one to three miles in width. Its main course was nearly east and west, but several arms branched off in different directions. The annexed sketch, by Mr. Hood, of the party when they first got sight of Point Lake, conveys the most accurate representation of their mode of travelling, and of the character of the country. I was much pleased with the able manner in which these officers executed the service they had been despatched upon, and was gratified to learn from them, that their companions had conducted themselves extremely well, and borne the fatigues of their journey most cheerfully. They scarcely ever had more than sufficient fuel to boil the kettle; and were generally obliged to lie down in their wet clothes, and consequently, suffered much from cold.

The distance which the parties have travelled, in their journey to and from Point Lake, may be estimated at one hundred and ten statute miles, which being added to the distances given in the preceding pages, will amount to one thousand five hundred and twenty miles that the expedition has travelled in 1820, up to the time of its residence at Fort Enterprise.

CHAPTER VII.

Transactions at Fort Enterprise—Mr. Back's Narrative of his Journey to Chipewyan and Return.

1820. September. DURING our little expedition to the Copper-Mine River, Mr. Wentzel had made great progress in the erection of our winter-house, having nearly roofed it in. But before proceeding to give an account of a ten months' residence at this place, henceforth designated Fort Enterprise, I may premise, that I shall omit many of the ordinary occurrences of a North-American winter, as they have been already detailed in so able and interesting a manner by Ellis*, and confine myself principally to the circumstances which had an influence on our progress on the ensuing summer. The observations on the magnetic needle, the temperature of the atmosphere, the Aurora Borealis, and other meteorological phenomena, together with the mineralogical and botanical notices, being less interesting to the general reader, are reserved for the Appendix.

The men continued to work diligently at the house, and by the 30th of September had nearly completed it for our reception, when a heavy fall of rain washed the greater part of the mud off the roof. This rain was remarked by the Indians as unusual, after what they had deemed so decided a commencement of winter in the early part of the month. The mean temperature for the month was $33\frac{5}{4}°$, but

* Voyage to Hudson's Bay in the Dobbs and California.

the thermometer had sunk as low as 16°, and on one occasion risen to 53°.

Besides the party constantly employed at the house, two men were appointed to fish, and others were occasionally sent for meat, as the hunters procured it. This latter employment, although extremely laborious, was always relished by the Canadians, as they never failed to use a prescriptive right of helping themselves to the fattest and most delicate parts of the deer. Towards the end of the month, the rein-deer began to quit the barren grounds, and came into the vicinity of the house, on their way to the woods; and the success of the hunters being consequently great, the necessity of sending for the meat considerably retarded the building of the house. In the mean time we resided in our canvass tents, which proved very cold habitations, although we maintained a fire in front of them, and also endeavoured to protect ourselves from the piercing winds by a barricade of pine branches.

On the 6th of October, the house being completed, we struck our tents, and removed into it. It was merely a log-building, fifty feet long, and twenty-four wide, divided into a hall, three bed-rooms, and a kitchen. The walls and roof were plastered with clay, the floors laid with planks rudely squared with the hatchet, and the windows closed with parchment of deer-skin. The clay, which, from the coldness of the weather, required to be tempered before the fire with hot water, froze as it was daubed on, and afterwards cracked in such a manner as to admit the wind from every quarter; yet, compared with the tents, our new habitation appeared comfortable; and having filled our capacious clay-built chimney with fagots, we spent a cheerful evening before the invigorating blaze. The change was peculiarly beneficial to Dr. Richardson, who having, in one of his excursions, incautiously laid down on the frozen side of a hill when heated with walking, had caught a severe inflammatory sore throat, which became daily worse whilst we remained in

the tents, but began to amend soon after he was enabled to confine himself to the more equable warmth of the house. We took up our abode at first on the floor, but our working party, who had shewn such skill as house-carpenters, soon proved themselves to be, with the same tools, the hatchet and crooked knife, excellent cabinet-makers, and daily added a table, chair, or bedstead, to the comforts of our establishment. The crooked knife, generally made of an old file, bent and tempered by heat, serves an Indian or Canadian voyager for plane, chisel, and auger. With it the snow-shoe and canoe-timbers are fashioned, the deals of their sledges reduced to the requisite thinness and polish, and their wooden bowls and spoons hollowed out. Indeed, though not quite so requisite for existence as the hatchet, yet without its aid there would be little comfort in these wilds.

On the 7th we were gratified by a sight of the sun, after it had been obscured for twelve days. On this and the several following days the meridian sun melted the light covering of snow or hoar frost on the lichens, which clothe the barren grounds, and rendered them so tender as to attract great herds of rein-deer to our neighbourhood. On the morning of the 10th I estimated the numbers I saw during a short walk, at upwards of two thousand. They form into herds of different sizes, from ten to a hundred, according as their fears or accident induce them to unite or separate.

The females being at this time more lean and active, usually lead the van. The haunches of the males are now covered to the depth of two inches or more with fat which is beginning to get red and high flavoured, and is considered a sure indication of the commencement of the rutting season. Their horns, which in the middle of August were yet tender, have now attained their proper size, and are beginning to lose their hairy covering which hangs from them in ragged filaments. The horns of the rein-deer vary, not only with its sex and age, but are otherwise so uncertain in their growth, that

they are never alike in any two individuals. The old males shed theirs about the end of December; the females retain them until the disappearance of the snow enables them to frequent the barren grounds, which may be stated to be about the middle or end of May, soon after which period they proceed towards the sea-coast and drop their young. The young males lose their horns about the same time with the females or a little earlier, some of them as early as April. The hair of the rein-deer falls in July, and is succeeded by a short thick coat of mingled clove, deep reddish, and yellowish, browns; the belly and under parts of the neck, &c., remaining white. As the winter approaches the hair becomes longer, and lighter in its colours, and it begins to loosen in May, being then much worn on the sides, from the animal rubbing itself against trees and stones. It becomes grayish and almost white, before it is completely shed. The Indians form their robes of the skins procured in autumn, when the hair is short. Towards the spring the larvæ of the œstrus attaining a large size, produce so many perforations in the skins, that they are good for nothing. The cicatrices only of these holes are to be seen in August, but a fresh set of *ova* have in the mean time been deposited *.

The rein-deer retire from the sea-coast in July and August, but in October on the verge of the barren grounds, and shelter themselves in the woods during the winter. They are often induced by a few fine days in winter, to pay a transitory visit to their favourite pastures in the barren country, but their principal movement to the northward commences generally in the end of April, when the snow

* "It is worthy of remark, that in the month of May a very great number of large larvæ exist under the mucous membrane at the root of the tongue, and posterior part of the nares and pharynx. The Indians consider them to belong to the same species with the œstrus, that deposits its ova under the skin; to us the larvæ of the former appeared more flattened than those of the latter. Specimens of both kinds, preserved in spirits, were destroyed by the frequent falls they received on the portages."—Dr. Richardson's Journal.

first begins to melt on the sides of the hills, and early in May, when large patches of the ground are visible, they are on the banks of the Copper-Mine River. The females take the lead in this spring migration, and bring forth their young on the sea-coast about the end of May or beginning of June. There are certain spots or passes well known to the Indians, through which the deer invariably pass in their migrations to and from the coast, and it has been observed that they always travel against the wind. The principal food of the rein-deer in the barren grounds, consists of the *cetraria nivalis* and *cucullata, cenomyce rangiferina, cornicularia ochrileuca,* and other lichens, and they also eat the hay or dry grass which is found in the swamps in autumn. In the woods they feed on the different lichens which hang from the trees. They are accustomed to gnaw their fallen antlers, and are said also to devour mice.

The weight of a full grown barren-ground deer, exclusive of the offal, varies from ninety to one hundred and thirty pounds. There is, however, a much larger kind found in the woody parts of the country, whose carcass weighs from two hundred to two hundred and forty pounds. This kind never leaves the woods, but its skin is as much perforated by the gad-fly as that of the others; a presumptive proof that the smaller species are not driven to the sea-coast by the attacks of that insect. There are a few rein-deer occasionally killed in the spring, whose skins are entire, and these are always fat, whereas the others are lean at that season. The gad-fly does not confine its attacks to the skin of the back, but deposits its *ova* in the mucous membrane also, which lines the nostrils and fauces. This insect likewise infests the red-deer *(wawaskeesh,)* but its ova are not found in the skin of the moose, or buffalo, nor, as we have been informed, of the sheep and goat that inhabit the rocky mountains, although the rein-deer found in those parts, (which by the way, are of an unusually large kind,) are as much tormented by them as the barren-ground variety.

The herds of rein-deer are attended in their migrations by bands of wolves, which destroy a great many of them. The Copper Indians kill the rein-deer in the summer with the gun, or taking advantage of a favourable disposition of the ground, they enclose a herd upon a neck of land, and drive them into a lake, where they fall an easy prey; but in the rutting season and in the spring, when they are numerous on the skirts of the woods, they catch them in snares. The snares are simple nooses, formed in a rope made of twisted sinew, which are placed in the aperture of a slight hedge, constructed of the branches of trees. This hedge is disposed so as to form several winding compartments, and although it is by no means strong, yet the deer seldom attempt to break through it. The herd is led into the labyrinth by two converging rows of poles, and one is generally caught at each of the openings by the noose placed there. The hunter, too, lying in ambush, stabs some of them with his bayonet as they pass by, and the whole herd frequently becomes his prey. Where wood is scarce, a piece of turf turned up answers the purpose of a pole to conduct them towards the snares.

The rein-deer has a quick eye, but the hunter by keeping to leeward and using a little caution, may approach very near; their apprehensions being much more easily roused by the smell than the sight of any unusual object. Indeed their curiosity often causes them to come close up to and wheel around the hunter; thus affording him a good opportunity of singling out the fattest of the herd, and upon these occasions they often become so confused by the shouts and gestures of their enemy, that they run backwards and forwards with great rapidity, but without the power of making their escape.

The Copper Indians find by experience that a white dress attracts them most readily, and they often succeed in bringing them within shot, by kneeling and vibrating the gun from side to side, in imitation of the motion of a deer's horns when he is in the act of rubbing his head against a stone.

The Dog-rib Indians have a mode of killing these animals, which though simple, is very successful. It was thus described by Mr. Wentzel, who resided long amongst that people. The hunters go in pairs, the foremost man carrying in one hand the horns and part of the skin of the head of a deer, and in the other a small bundle of twigs, against which he, from time to time, rubs the horns, imitating the gestures peculiar to the animal. His comrade follows treading exactly in his footsteps, and holding the guns of both in a horizontal position, so that the muzzles project under the arms of him who carries the head. Both hunters have a fillet of white skin round their foreheads, and the foremost has a strip of the same kind round his wrists. They approach the herd by degrees, raising their legs very slowly, but setting them down somewhat suddenly, after the manner of a deer, and always taking care to lift their right or left feet simultaneously. If any of the herd leave off feeding to gaze upon this extraordinary phenomenon, it instantly stops, and the head begins to play its part by licking its shoulders, and performing other necessary movements. In this way the hunters attain the very centre of the herd without exciting suspicion, and have leisure to single out the fattest. The hindmost man then pushes forward his comrade's gun, the head is dropt, and they both fire nearly at the same instant. The herd scampers off, the hunters trot after them; in a short time the poor animals halt to ascertain the cause of their terror, their foes stop at the same instant, and having loaded as they ran, greet the gazers with a second fatal discharge. The consternation of the deer increases, they run to and fro in the utmost confusion, and sometimes a great part of the herd is destroyed within the space of a few hundred yards.

A party who had been sent to Akaitcho returned, bringing three hundred and seventy pounds of dried meat, and two hundred and twenty pounds of suet, together with the unpleasant information, that a still larger quantity of the latter article had been found

and carried off, as he supposed, by some Dog-ribs, who had passed that way.

The weather becoming daily colder, all the lakes in the neighbourhood of the house were completely, and the river partially, frozen over by the middle of the month. The rein-deer now began to quit us for more southerly and better-sheltered pastures. Indeed, their longer residence in our neighbourhood would have been of little service to us, for our ammunition was almost completely expended, although we had dealt it of late with a very sparing hand to the Indians. We had, however, already secured in the store-house the carcasses of one hundred deer, together with one thousand pounds of suet, and some dried meat; and had, moreover, eighty deer stowed up at various distances from the house. The necessity of employing the men to build a house for themselves, before the weather became too severe, obliged us to put the latter *en cache*, as the voyagers term it, instead of adopting the more safe plan of bringing them to the house. Putting a deer *en cache*, means merely protecting it against the wolves, and still more destructive wolverenes, by heavy loads of wood or stones; the latter animal, however, sometimes digs underneath the pile, and renders the precaution abortive.

On the 18th, Mr. Back and Mr. Wentzel set out for Fort Providence, accompanied by Beauparlant, Belanger, and two Indians, Akaiyazza and Thoolezzeh, with their wives, the Little Forehead, and the Smiling Marten. Mr. Back had volunteered to go and make the necessary arrangements for transporting the stores we expected from Cumberland House, and to endeavour to obtain some additional supplies from the establishments at Slave Lake. If any accident should have prevented the arrival of our stores, and the establishments at Moose-deer Island should be unable to supply the deficiency, he was, if he found himself equal to the task, to proceed to Chipewyan. Ammunition was essential to our existence, and a

considerable supply of tobacco was also requisite, not only for the comfort of the Canadians, who use it largely, and had stipulated for it in their engagements, but also as a means of preserving the friendship of the Indians. Blankets, cloth, and iron-work, were scarcely less indispensable to equip our men for the advance next season.

Mr. Wentzel accompanied Mr. Back, to assist him in obtaining from the traders, on the score of old friendship, that which they might be inclined to deny to our necessities. I forwarded by them letters to the Colonial Office and Admiralty, detailing the proceedings of the Expedition up to this period.

On the 22d we were surprised by a visit from a dog; the poor animal was in low condition, and much fatigued. Our Indians discovered, by marks on his ears, that he belonged to the Dog-ribs. This tribe, unlike the Chipewyans and Copper Indians, had preserved that useful associate of man, although from their frequent intercourse with the latter people, they were not ignorant of the prediction alluded to in a former page. One of our interpreters was immediately despatched, with an Indian, to endeavour to trace out the Dog-ribs, whom he supposed might be concealed in the neighbourhood from their dread of the Copper Indians; although we had no doubt of their coming to us, were they aware of our being here. The interpreter, however, returned without having discovered any traces of strange Indians; a circumstance which led us to conclude, that the dog had strayed from his masters a considerable time since.

Towards the end of the month the men completed their house, and took up their abode in it. It was thirty-four feet long and eighteen feet wide; was divided into two apartments, and was placed at right angles to the officers' dwelling, and facing the store-house: the three buildings forming three sides of a quadrangle.

On the 26th Akaitcho and his party arrived, the hunting in this

Drawn by Lieut. Hood R.N.

Engraved by Edwd Finden.

WINTER VIEW OF FORT ENTERPRIZE.

Snow melting May 13th 1821.

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neighbourhood being terminated for the season, by the deer having retired to the southward to shelter themselves in the woods.

The arrival of this large party was a serious inconvenience to us, from our being compelled to issue them daily rations of provision from the store. The want of ammunition prevented us from equipping and sending them to the woods to hunt; and although they are accustomed to subsist themselves for a considerable part of the year by fishing, or snaring the deer, without having recourse to fire-arms, yet, on the present occasion, they felt little inclined to do so, and gave scope to their natural love of ease, as long as our store-house seemed to be well stocked. Nevertheless, as they were conscious of impairing our future resources, they did not fail, occasionally, to remind us that it was not their fault, to express an ardent desire to go a hunting, and to request a supply of ammunition, although they knew that it was not in our power to give it.

The summer birds by this time had entirely deserted us, leaving, for our winter companions, the raven, cinereous crow, ptarmigan, and snow-bird. The last of the water-fowl that quitted us was a species of diver, of the same size with the *colymbus arcticus*, but differing from it in the arrangement of the white spots on its plumage, and in having a yellowish white bill. This bird was occasionally caught in our fishing nets.

The thermometer during the month of October, at Fort Enterprise, never rose above 37°, or fell below 5°; the mean temperature for the month was 23°.

In the beginning of October a party had been sent to the westward to search for birch to make snow-shoe frames, and the Indian women were afterwards employed in netting the shoes and preparing leather for winter-clothing to the men. Robes of rein-deer skins were also obtained from the Indians, and issued to the men who were to travel, as they are not only a great deal lighter than blankets, but also much warmer, and altogether better adapted for a winter in this climate. They are, however, unfit for summer use,

as the least moisture causes the skin to spoil, and lose its hair. It requires the skins of seven deer to make one robe. The finest are made of the skins of young fawns.

The fishing, having failed as the weather became more severe, was given up on the 5th. It had procured us about one thousand two hundred *white fish*, from two to three pounds each. There are two other species of *salmo* in Winter Lake; *Back's grayling* and the *round fish*, and a few *trout*, *pike*, *methye*, and *red carp*, were also occasionally obtained from the nets. It may be worthy of notice here, that the fish froze as they were taken out of the nets, in a short time became a solid mass of ice, and by a blow or two of the hatchet were easily split open, when the intestines might be removed in one lump. If in this completely frozen state they were thawed before the fire, they recovered their animation. This was particularly the case with the carp, and we had occasion to observe it repeatedly, as Dr. Richardson occupied himself in examining the structure of the different species of fish, and was always, in the winter, under the necessity of thawing them before he could cut them. We have seen a carp recover so far as to leap about with much vigour, after it had been frozen for thirty-six hours.

From the 12th to the 16th we had fine, and for the season warm, weather, and the deer, which had not been seen since the 26th of October, re-appeared in the neighbourhood of the house, to the surprise of the Indians, who attributed their return to the barren grounds, to the unusual mildness of the season. On this occasion, by melting some of our pewter cups, we managed to furnish five balls to each of the hunters, but they were all expended unsuccessfully, except by Akaitcho, who killed two deer.

By the middle of the month Winter River was firmly frozen over, except the small rapid at its commencement, which remained open all the winter. The ice on the lake was now nearly two feet thick. After the 16th we had a succession of cold, snowy, and windy weather. We had become anxious to hear of the arrival of Mr. Back and his party at Fort Providence. The Indians, who had calculated

the period at which a messenger ought to have returned from thence to be already passed, became impatient when it had elapsed, and with their usual love of evil augury tormented us by their melancholy forebodings. At one time they conjectured that the whole party had fallen through the ice; at another, that they had been way-laid and cut off by the Dog-ribs. In vain did we urge the improbability of the former accident, or the peaceable character of the Dog-ribs, so little in conformity with the latter. "The ice at this season was deceitful," they said, "and the Dog-ribs, though unwarlike, were treacherous." These assertions, so often repeated, had some effect upon the spirits of our Canadian voyagers, who seldom weigh any opinion they adopt; but we persisted in treating their fears as chimerical, for had we seemed to listen to them for a moment, it is more than probable that the whole of our Indians would have gone to Fort Providence in search of supplies, from whence we should have found it extremely difficult to have recovered them.

The matter was put to rest by the appearance of Belanger on the morning of the 23d, and the Indians, now running into the opposite extreme, were disposed to give us more credit for our judgment than we deserved. They had had a tedious and fatiguing journey to Fort Providence, and for some days were destitute of provisions.

Belanger arrived alone; he had walked constantly for the last six-and-thirty hours, leaving his Indian companions encamped at the last woods, they being unwilling to accompany him across the barren grounds during the storm that had prevailed for several days, and blew with unusual violence on the morning of his arrival. His locks were matted with snow, and he was incrusted with ice from head to foot, so that we scarcely recognised him when he burst in upon us. We welcomed him with the usual shake of the hand, but were unable to give him the glass of rum which every voyager receives on his arrival at a trading post.

As soon as his packet was thawed, we eagerly opened it to

obtain our English letters. The latest were dated on the preceding April. They came by way of Canada, and were brought up in September to Slave Lake by the North-West Company's canoes.

We were not so fortunate with regard to our stores; of ten pieces which had been sent from York Factory by Governor Williams, five of the most essential had been left at the Grand Rapid on the Saskatchawan, owing, as far as we could judge from the accounts that reached us, to the misconduct of the officer to whom they were intrusted, and who was ordered to convey them to Cumberland-House. Being overtaken by some of the North-West Company's canoes, he had insisted on their taking half of his charge as it was intended for the service of Government. The North-West gentlemen objected, that their canoes had already got a cargo in, and that they had been requested only to convey our stores from Cumberland-House where they had a canoe waiting for the purpose. The Hudson's-Bay officer upon this deposited our ammunition and tobacco upon the beach, and departed without any regard to the serious consequences that might result to us from the want of them. The Indians, who assembled at the opening of the packet, and sat in silence watching our countenances, were necessarily made acquainted with the non-arrival of our stores, and bore the intelligence with unexpected tranquillity. We took care, however, in our communications with them to dwell upon the more agreeable parts of our intelligence, and they seemed to receive particular pleasure on being informed of the arrival of two Esquimaux interpreters at Slave Lake on their way to join the party. The circumstance not only quieted their fears of opposition from the Esquimaux on our descent to the sea next season, but also afforded a substantial proof of our influence in being able to bring two people of that nation from such a distance.

Akaitcho, who is a man of great penetration and shrewdness, duly appreciated these circumstances; indeed he has often surprised us

by his correct judgment of the character of individuals amongst the traders or of our own party, although his knowledge of their opinions was, in most instances, obtained through the imperfect medium of interpretation. He was an attentive observer, however, of every action, and steadily compared their conduct with their pretensions.

By the newspapers we learnt the demise of our revered and lamented sovereign George III., and the proclamation of George IV. We concealed this intelligence from the Indians, lest the death of their great Father might lead them to suppose that we should be unable to fulfil our promises to them.

The Indians who had left Fort Providence with Belanger arrived the day after him, and, amongst other intelligence, informed Akaitcho of some reports they had heard to our disadvantage. They stated that Mr. Weeks, the gentleman in charge of Fort Providence, had told them, that so far from our being what we represented ourselves to be, the officers of a great King, we were merely a set of dependant wretches, whose only aim was to obtain subsistence for a season in the plentiful country of the Copper Indians; that, out of charity, we had been supplied with a portion of goods by the trading Companies, but that there was not the smallest probability of our being able to reward the Indians when their term of service was completed. Akaitcho, with great good sense, instantly came to have the matter explained, stating at the same time, that he could not credit it. I then pointed out to him that Mr. Wentzel, with whom they had long been accustomed to trade, had pledged the credit of his Company for the stipulated rewards to the party that accompanied us, and that the trading debts due by Akaitcho and his party had already been remitted, which was of itself a sufficient proof of our influence with the North-West Company. I also reminded Akaitcho, that our having caused the Esquimaux to be brought up at a great expense, was evidence of our future intentions, and informed him that I should write to Mr. Smith, the

senior trader in the department, on the subject, when I had no doubt that a satisfactory explanation would be given. The Indians retired from the conference apparently satisfied, but this business was in the end productive of much inconvenience to us, and proved very detrimental to the progress of the Expedition. In conjunction also with other intelligence conveyed in Mr. Back's letters respecting the disposition of the traders towards us, particularly a statement of Mr. Weeks, that he had been desired not to assist us with supplies from his post, it was productive of much present uneasiness to me.

On the 28th St. Germain, the interpreter, set out with eight Canadian voyagers and four Indian hunters to bring up our stores from Fort Providence. I wrote by him to Mr. Smith, at Moose-Deer Island, and Mr. Keith, at Chipewyan, both of the North-West Company, urging them in the strongest manner to comply with the requisition for stores, which Mr. Back would present. I also informed Mr. Simpson, principal agent in the Athabasca for the Hudson's Bay Company, who had proffered every assistance in his power, that we should gladly avail ourselves of the kind intentions expressed in a letter which I had received from him.

We also sent a number of broken axes to Slave Lake to be repaired. The dog that came to us on the 22d of October, and had become very familiar, followed the party. We were in hopes that it might prove of some use in dragging their loads, but we afterwards learnt, that on the evening after their departure from the house, they had the cruelty to kill and eat it, although they had no reason to apprehend a scarcity of provision. A dog is considered to be delicate eating by the voyagers.

The mean temperature of the air for November was — 0.7°. The greatest heat observed was 25° above, and the least 31° below, zero.

On the 1st of December the sky was clear, a slight appearance of stratus only being visible near the horizon; but a kind of snow fell

at intervals in the forenoon, its particles so minute as to be observed only in the sunshine. Towards noon the snow became more apparent, and the two limbs of a prismatic arch were visible, one on each side of the sun near its place in the heavens, the centre being deficient. We have frequently observed this descent of minute icy spiculæ when the sky appears perfectly clear, and could even perceive that its silent, but continued, action added to the snowy covering of the ground.

Having received one hundred balls from Fort Providence by Belanger, we distributed them amongst the Indians, informing the leader at the same time, that the residence of so large a party as his at the house, amounting, with women and children, to forty souls, was producing a serious reduction in our stock of provision. He acknowledged the justice of the statement, and promised to remove as soon as his party had prepared snow-shoes and sledges for themselves. Under one pretext or other, however, their departure was delayed until the 10th of the month, when they left us, having previously received one of our fishing-nets, and all the ammunition we possessed. The leader left his aged mother and two female attendants to our care, requesting, that if she died during his absence, she might be buried at a distance from the fort, that he might not be reminded of his loss when he visited us.

Keskarrah, the guide, also remained behind, with his wife and daughter. The old man has become too feeble to hunt, and his time is almost entirely occupied in attendance upon his wife, who has been long affected with an ulcer on the face, which has nearly destroyed her nose.

Lately he made an offering to the water spirits, whose wrath he apprehended to be the cause of her malady. It consisted of a knife, a piece of tobacco, and some other trifling articles, which were tied up in a small bundle, and committed to the rapid with a long prayer. He does not trust entirely, however, to the relenting of

the spirits for his wife's cure, but comes daily to Dr. Richardson for medicine.

Upon one occasion he received the medicine from the Doctor with such formality, and wrapped it up in his rein-deer robe with such extraordinary carefulness, that it excited the involuntary laughter of Mr. Hood and myself. The old man smiled in his turn, and as he always seemed proud of the familiar way in which we were accustomed to joke with him, we thought no more upon the subject. But he unfortunately mentioned the circumstance to his wife, who imagined in consequence, that the drug was not productive of its usual good effects, and they immediately came to the conclusion that some bad medicine had been intentionally given to them. The distress produced by this idea, was in proportion to their former faith in the potency of the remedy, and the night was spent in singing and groaning. Next morning the whole family were crying in concert, and it was not until the evening of the second day that we succeeded in pacifying them. The old woman began to feel better, and her faith in the medicine was renewed.

While speaking of this family, I may remark that the daughter, whom we designated Green-stockings from her dress, is considered by her tribe to be a great beauty. Mr. Hood drew an accurate portrait of her, although her mother was averse to her sitting for it. She was afraid, she said, that her daughter's likeness would induce the great Chief who resided in England to send for the original. The young lady, however, was undeterred by any such fear. She has already been an object of contest between her countrymen, and although under sixteen years of age, has belonged successively to two husbands, and would probably have been the wife of many more, if her mother had not required her services as a nurse.

The weather during this month, was the coldest we experienced during our residence in America. The thermometer sunk on one occasion to 57° below zero, and never rose beyond 6° above it; the

Drawn by Lieu.t Hood, R.N.

KESHARRAH A COPPER INDIAN GUIDE AND HIS DAUGHTER GREEN STOCKINGS.
mending a snow shoe.

Published March 1823, by John Murray, London

mean for the month was —29.7°. During these intense colds, however, the atmosphere was generally calm, and the wood-cutters and others went about their ordinary occupations without using any extraordinary precautions, yet without feeling any bad effects. They had their rein-deer shirts on, leathern mittens lined with blankets, and furred caps; but none of them used any defence for the face, nor did they need to do so. Indeed we have already mentioned that the heat is abstracted most rapidly from the body during strong breezes, and most of those who have perished from cold in this country, have fallen a sacrifice to their being overtaken on a lake or other unsheltered place, by a storm of wind. The intense colds were, however, detrimental to us in another way. The trees froze to their very centres, and became as hard as stones, and more difficult to cut. Some of the axes were broken daily, and by the end of the month we had only one left that was fit for felling trees. By intrusting it only to one of the party who had been bred a carpenter, and who could use it with dexterity, it was fortunately preserved until the arrival of our men with others from Fort Providence.

A thermometer, hung in our bed-room at the distance of sixteen feet from the fire, but exposed to its direct radiation, stood even in the day-time occasionally at 15° below zero, and was observed more than once previous to the kindling of the fire in the morning, to be as low as 40° below zero. On two of these occasions the chronometers 2149 and 2151 which during the night lay under Mr. Hood's and Dr. Richardson's pillows, stopped while they were dressing themselves.

The rapid at the commencement of the river remained open in the severest weather, although it was somewhat contracted in width. Its temperature was 32°, as was the surface of the river opposite the house, about a quarter of a mile lower down, tried at a hole in the ice, through which water was drawn for domestic purposes. The

river here was two fathoms and a half deep, and the temperature at its bottom was at least 42° above zero. This fact was ascertained by a spirit thermometer; in which, probably, from some irregularity in the tube, a small portion of the coloured liquor usually remained at 42° when the column was made to descend rapidly. In the present instance the thermometer standing at 47° below zero, with no portion of the fluid in the upper part of the tube was let down slowly into the water, but drawn cautiously and rapidly up again, when a red drop at + 42° indicated that the fluid had risen to that point or above it. At this period the daily visits of the sun were very short, and owing to the obliquity of his rays, afforded us little warmth or light. It is half past eleven before he peeps over a small ridge of hills opposite to the house, and he sinks in the horizon at half past two. On the 28th Mr. Hood, in order to attain an approximation to the quantity of terrestrial refraction, observed the sun's meridional altitude when the thermometer stood at 46° below zero, at the imminent hazard of having his fingers frozen.

He found the sextant had changed its error considerably, and that the glasses had lost their parallelism from the contraction of the brass. In measuring the error he perceived that the diameter of the sun's image was considerably short of twice the semi-diameter; a proof of the uncertainty of celestial observations made during these intense frosts. The results of this and another similar observation are given at the bottom of the page*.

* "The observed meridian altitude of ⊙ upper limb was 2° 52′ 51″. Temperature of the air — 45° 5′. By comparing this altitude, corrected by the mean refraction and parallax, with that deduced from the latitude which was observed in autumn, the increase of refraction is found to be 6′ 50″, the whole refraction, therefore, for the altitude 2° 52′ 51″ is 21′ 49″. Admitting that the refraction increases in the same ratio as that of the atmosphere at a mean state of temperature, the horizontal refraction will be 47′ 22″. But the diameter of the sun measured immediately after the observation, was only 27′ 7″, which shews an increase of refraction at the lower limb of 3′ 29″. The horizontal refraction calculated with this difference, and the above-mentioned ratio, is 56′ 3″, at the temperature

The aurora appeared with more or less brilliancy on twenty-eight nights in this month, and we were also gratified by the resplendent beauty of the moon, which for many days together performed its circle round the heavens, shining with undiminished lustre, and scarcely disappearing below the horizon during the twenty-four hours.

During many nights there was a halo round the moon, although the stars shone brightly, and the atmosphere appeared otherwise clear. The same phenomenon was observed round the candles, even in our bed-rooms; the diameter of the halo increasing as the observer receded from the light. These halos, both round the moon and candles, occasionally exhibited faintly some of the prismatic colours.

As it may be interesting to the reader to know how we passed

– 45° 5′. So that in the parallel 68° 42′, where, if there was no refraction, the sun would be invisible for thirty-four days, his upper limb, with the refraction 56′ 3″, is, in fact, above the horizon at every noon.

The wind was from the westward a moderate breeze, and the air perfectly clear. January 1st, 1821. Observed meridian altitude of ⊙ lower limb 2° 35′ 20″. ⊙ apparent diameter 29° 20′. For apparent altitude 2° 35′ 20″, the mean refraction is 16′ 5″ (Mackay's Tables), and the true, found as detailed above, is 20′ 8″: which increasing in the same ratio as that of the atmosphere, at a mean state of temperature, is 41′ 19″ at the horizon. But the difference of refraction at the upper and lower limbs, increasing also in that ratio, gives 55′ 16″ for the horizontal refraction. Temperature of the air — 41°. Wind north, a light breeze, a large halo visible about the sun. January 15th, 1821.—Observed an apparent meridian altitude ⊙ lower limb 4° 24′ 57″. ⊙ apparent diameter 31′ 5″. For apparent altitude 4° 24′ 57″, the mean refraction is 10′ 58″ (Mackay's Tables), and the true, found as detailed above, is 14′ 39″, which increasing in the same ratio as that of the atmosphere at a mean state of temperature, is 43′ 57″ at the horizon. But the difference of refraction between the upper and lower limbs, increasing also in that ratio, gives 48′ 30″ for the horizontal refraction.

Temperature of the air — 35°, a light air from the westward, very clear.

The extreme coldness of the weather rendered these operations difficult and dangerous; yet I think the observations may be depended upon within 30″, as will appear by their approximate results in calculating the horizontal refraction; for it must be considered that an error of 30″, in the refraction in altitude, would make a difference of several minutes in the horizontal refraction."—Mr. Hood's Journal.

our time at this season of the year, I shall mention briefly, that a considerable portion of it was occupied in writing up our journals. Some newspapers and magazines, that we had received from England with our letters, were read again and again, and commented upon, at our meals; and we often exercised ourselves with conjecturing the changes that might take place in the world before we could hear from it again. The probability of our receiving letters, and the period of their arrival, were calculated to a nicety. We occasionally paid the woodmen a visit, or took a walk for a mile or two on the river.

In the evenings we joined the men in the hall, and took a part in their games, which generally continued to a late hour; in short, we never found the time to hang heavy upon our hands; and the peculiar occupations of each of the officers afforded them more employment than might at first be supposed. I re-calculated the observations made on our route; Mr. Hood protracted the charts, and made those drawings of birds, plants, and fishes, which cannot appear in this work, but which have been the admiration of every one who has seen them. Each of the party sedulously and separately recorded their observations on the aurora, and Dr. Richardson contrived to obtain from under the snow specimens of most of the lichens in the neighbourhood, and to make himself acquainted with the mineralogy of the surrounding country.

The Sabbath was always a day of rest with us; the woodmen were required to provide for the exigencies of that day on Saturday, and the party were dressed in their best attire. Divine service was regularly performed, and the Canadians attended, and behaved with great decorum, although they were all Roman Catholics, and but little acquainted with the language in which the prayers were read. I regretted much that we had not a French Prayer-Book, but the Lord's Prayer and Creed were always read to them in their own language.

Our diet consisted almost entirely of rein-deer meat, varied twice a week by fish, and occasionally by a little flour, but we had no vegetables of any description. On the Sunday mornings we drank a cup of chocolate, but our greatest luxury was tea (without sugar), of which we regularly partook twice a-day. With rein-deers' fat, and strips of cotton shirts, we formed candles; and Hepburn acquired considerable skill in the manufacture of soap, from the wood-ashes, fat, and salt. The formation of soap was considered as rather a mysterious operation by our Canadians, and, in their hands, was always supposed to fail if a woman approached the kettle in which the ley was boiling. Such are our simple domestic details.

On the 30th, two hunters came from the leader, to convey ammunition to him, as soon as our men should bring it from Fort Providence.

The men, at this time, coated the walls of the house on the outside, with a thin mixture of clay and water, which formed a crust of ice, that, for some days, proved impervious to the air; the dryness of the atmosphere, however, was such, that the ice in a short time evaporated, and gave admission to the wind as before. It is a general custom at the forts to give this sort of coating to the walls at Christmas time. When it was gone we attempted to remedy its defect, by heaping up snow against the walls.

1821, January 1. This morning our men collected, and greeted us with the customary salutation on the commencement of the new year. That they might enjoy a holiday, they had yesterday collected double the usual quantity of fire-wood, and we anxiously expected the arrival of the men from Fort Providence, with some additions to their comforts. We were led the more readily to hope for their arrival before the evening, as we knew that every voyager uses his utmost endeavour to reach a post upon, or previous to, the *jour de l'an*, that he may partake of the wonted festivities. It forms the theme of their conversation for months before and after

the period of its arrival. On the present occasion we could only treat them with a little flour and fat; these were both considered as great luxuries, but still the feast was defective from the want of rum, although we promised them a little when it should arrive.

The early part of January proved mild, the thermometer rose to 20° above zero, and we were surprised by the appearance of a kind of damp fog approaching very nearly to rain. The Indians expressed their astonishment at this circumstance, and declared the present to be one of the warmest winters they had ever experienced. Some of them reported that it had actually rained in the woody parts of the country. In the latter part of the month, however, the thermometer again descended to — 49°, and the mean temperature for the month proved to be — 15.6°. Owing to the fogs that obscured the sky the aurora was visible only upon eighteen nights in the month.

On the 15th seven of our men arrived from Fort Providence with two kegs of rum, one barrel of powder, sixty pounds of ball, two rolls of tobacco, and some clothing. They had been twenty-one days on their march from Slave Lake, and the labour they underwent was sufficiently evinced by their sledge-collars having worn out the shoulders of their coats. Their loads weighed from sixty to ninety pounds each, exclusive of their bedding and provisions, which at starting must have been at least as much more. We were much rejoiced at their arrival, and proceeded forthwith to pierce the spirit cask, and issue to each of the household the portion of rum which had been promised to them on the first day of the year. The spirits, which were proof, were frozen, but after standing at the fire for some time they flowed out of the consistency of honey. The temperature of the liquid, even in this state, was so low as instantly to convert into ice the moisture which condensed on the surface of the dram-glass. The fingers also adhered to the glass, and would, doubtless, have been speedily frozen had they been kept in contact with it, yet

each of the voyagers swallowed his dram without experiencing the slightest inconvenience, or complaining even of the tooth-ach.

After the men had retired, an Indian, who had accompanied them from Fort Providence, informed me that they had broached the cask on their way up and spent two days in drinking. This instance of breach of trust was excessively distressing to me; I felt for their privations and fatigues, and was disposed to seize upon every opportunity of alleviating them, but this, combined with many instances of petty dishonesty with regard to meat, shewed how little confidence could be put in a Canadian voyager when food or spirits were in question. We had been indeed made acquainted with their character on these points by the traders, but we thought that when they saw their officers living under equal if not greater privations than themselves, they would have been prompted by some degree of generous feeling to abstain from those depredations which, under ordinary circumstances, they would scarcely have blushed to be detected in.

As they were pretty well aware that such a circumstance could not long be concealed from us, one of them came the next morning with an artful apology for their conduct. He stated, that as they knew it was my intention to treat them with a dram on the commencement of the new year, they had helped themselves to a small quantity on that day, trusting to my goodness for forgiveness; and being unwilling to act harshly at this period, I did forgive them, after admonishing them to be very circumspect in their future conduct.

The ammunition, and a small present of rum, were sent to Akaitcho.

On the 18th Vaillant, the woodman, had the misfortune to break his axe. This would have been a serious evil had it occurred a few weeks sooner, but we had just received some others from Slave Lake.

On the 27th Mr. Wentzel and St. Germain arrived with the

two Esquimaux, Tattannœuck and Hœootœrock, (the belly and the ear.) The English names, which were bestowed upon them at Fort Churchill, are Augustus and Junius. The former speaks English.

We now learnt that Mr. Back proceeded with Beauparlant to Fort Chipewyan, on the 24th of December, to procure stores, having previously discharged J. Belleau from our service at his own request, and with my consent. I was the more induced to comply with this man's desire of leaving us, as he proved to be too weak to perform the duty of bowman which he had undertaken.

Four dogs were brought up by this party, and proved a great relief to our wood-haulers during the remainder of the season.

By the arrival of Mr. Wentzel, who is an excellent musician, and assisted us (*con amore*) in our attempts to amuse the men, we were enabled to gratify the whole establishment with an occasional dance. This is an amusement of which the voyagers are very fond, and not the less so, as it was now and then accompanied by a dram as long as our rum lasted.

On the 5th of February, two Canadians came from Akaitcho for further supplies of ammunition. We were mortified to learn that he had received some further unpleasant reports concerning us from Fort Providence, and that his faith in our good intentions was somewhat shaken. He expressed himself dissatisfied with the quantity of ammunition we had sent him, accused us of an intention of endeavouring to degrade him in the eyes of his tribe, and informed us that Mr. Weeks had refused to pay some notes for trifling quantities of goods and ammunition that had been given to the hunters who accompanied our men to Slave Lake.

Some powder and shot, and a keg of diluted spirits were sent to him with the strongest assurances of our regard.

On the 12th, another party of six men was sent to Fort Providence, to bring up the remaining stores. St. Germain went to

Drawn by Lieut.t Back, R.N.

JUNIUS. AUGUSTUS.

PORTRAITS OF TWO ESKIMAUX INTERPRETERS.

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Akaitcho for the purpose of sending two of his hunters to join this party on its route.

On comparing the language of our two Esquimaux with a copy of St. John's Gospel, printed for the use of the Moravian Missionary Settlements on the Labrador coast, it appeared that the Esquimaux who resort to Churchill speak a language essentially the same with those who frequent the Labrador coast. The Red Knives, too, recognise the expression *Teyma*, used by the Esquimaux when they accost strangers in a friendly manner, as similarly pronounced by Augustus, and those of his race who frequent the mouth of the Copper-Mine River.

The tribe to which Augustus belongs resides generally a little to the northward of Churchill. In the spring, before the ice quits the shores, they kill seal, but during winter they frequent the borders of the large lakes near the coast, where they obtain fish, rein-deer, and musk-oxen.

There are eighty-four grown men in the tribe, only seven of whom are aged. Six Chiefs have in general two wives; the rest of the men have only one, so that the number of married people may amount to one hundred and seventy. He could give me no certain data whereby I might estimate the number of children.

Two great Chiefs, or *Ackhaiyoot*, have complete authority in directing the movements of the party, and in distributing provisions. The *Attooganœuck*, or lesser Chiefs, are respected principally as senior men. They seldom suffer from want of food, if the Chief moves to the different stations at the proper season. The Esquimaux seem to follow the eastern custom respecting marriage. As soon as a girl is born, the young lad who wishes to have her for a wife goes to her father's tent, and proffers himself. If accepted, a promise is given which is considered binding, and the girl is delivered to her betrothed husband at the proper age.

They consider their progenitors to have come from the moon.

Augustus has no other idea of a Deity than some confused notions which he has obtained at Churchill.

When any of the tribe is dangerously ill, a conjurer is sent for, and the bearer of the message carries a suitable present to induce his attendance. Upon his arrival he encloses himself in the tent with the sick man, and sings over him for days together without tasting food; but Augustus, as well as the rest of the uninitiated, are ignorant of the purport of his songs, and of the nature of the Being to whom they are addressed. The conjurers practise a good deal of jugglery in swallowing knives, firing bullets through their bodies, *&c.*, but they are generally secluded from view, and the by-standers believe their assertions, without requiring to be eye-witnesses of the fact. Sixteen men and three women amongst Augustus' tribe are acquainted with the mysteries of the art. The skill of the latter is exerted only on their own sex.

Upon the map being spread before Augustus, he soon comprehended it, and recognised Chesterfield Inlet to be "the opening into which salt water enters at spring tides, and which receives a river at its upper end." He termed it *Kannœuck Kleenœuck.* He has never been farther north himself than Marble Island, which he distinguishes as being the spot where the large ships were wrecked, alluding to the disastrous termination of Barlow and Knight's Voyage of Discovery *. He says, however, that Esquimaux of three different tribes have traded with his countrymen, and that they described themselves as having come across land from a northern sea. One tribe, who named themselves *Ahwhacknanhelett,* he supposes may come from Repulse Bay; another, designated *Ootkooseek-kalingmœoot,* or Stone-Kettle Esquimaux, reside more to the westward; and the third, the *Kang-orr-mœoot,* or White Goose Esquimaux, describe themselves as coming from a great distance, and mentioned that a party of Indians had killed several of their tribe

* See Introduction to HEARNE'S *Journey,* page xxiv.

on the summer preceding their visit. Upon comparing the dates of this murder with that of the last massacre which the Copper Indians have perpetrated on these harmless and defenceless people, they appear to differ two years; but the lapse of time is so inaccurately recorded, that this difference in their accounts is not sufficient to destroy their identity; besides, the Chipewyans, the only other Indians who could possibly have committed the deed, have long since ceased to go to war. If this massacre should be the one mentioned by the Copper Indians, the Kang-orr-mœoot must reside near the mouth of the Anatessy, or River of Strangers.

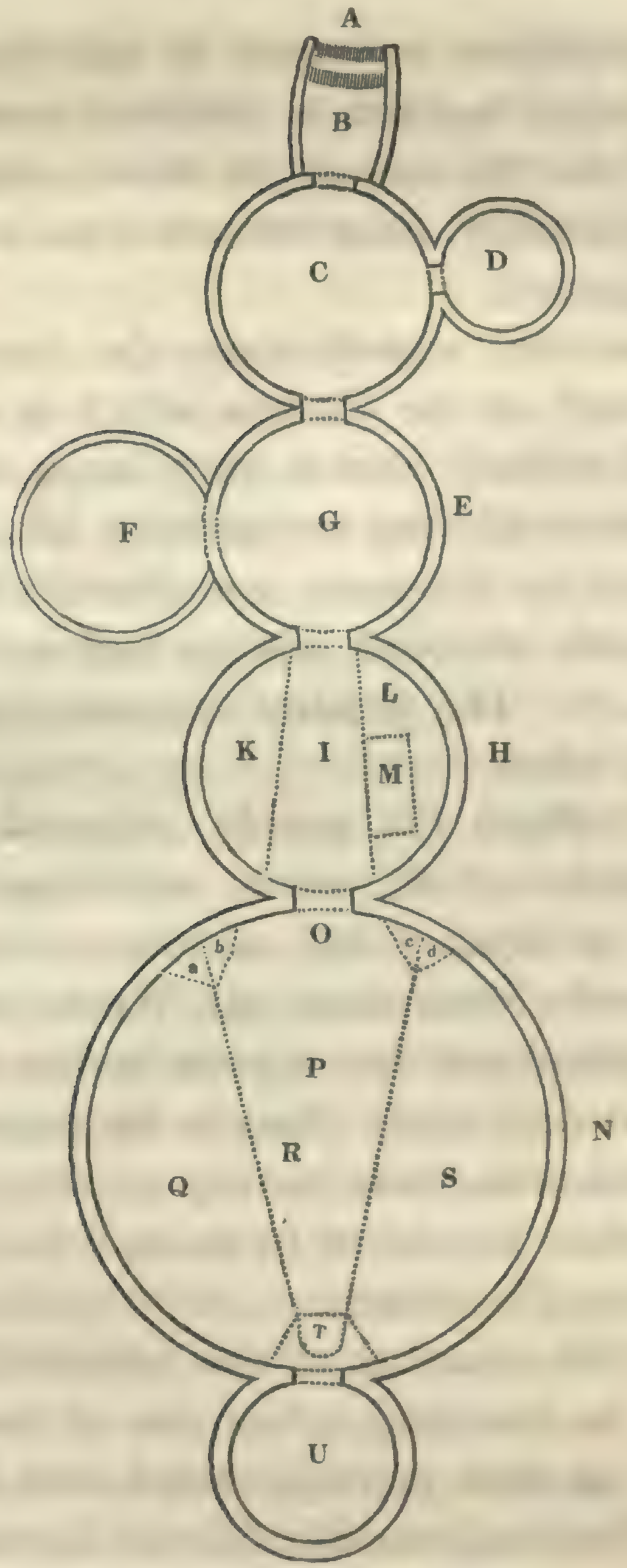
The winter habitations of the Esquimaux, who visit Churchill, are built of snow, and judging from one constructed by Augustus to-day, they are very comfortable dwellings. Having selected a spot on the river, where the snow was about two feet deep, and sufficiently compact, he commenced by tracing out a circle twelve feet in diameter. The snow in the interior of the circle was next divided with a broad knife, having a long handle, into slabs three feet long, six inches thick, and two feet deep, being the thickness of the layer of snow. These slabs were tenacious enough to admit of being moved about without breaking, or even losing the sharpness of their angles, and they had a slight degree of curvature, corresponding with that of the circle from which they were cut. They were piled upon each other exactly like courses of hewn stone around the circle which was traced out, and care was taken to smooth the beds of the different courses with the knife, and to cut them so as to give the wall a slight inclination inwards, by which contrivance the building acquired the properties of a dome. The dome was closed somewhat suddenly and flatly by cutting the upper slabs in a wedge-form, instead of the more rectangular shape of those below. The roof was about eight feet high, and the last aperture was shut up by a small conical piece. The whole was built from within, and each slab was cut so that it retained its position without requiring sup-

port until another was placed beside it, the lightness of the slabs greatly facilitating the operation. When the building was covered in, a little loose snow was thrown over it, to close up every chink, and a low door was cut through the walls with the knife. A bed-place was next formed, and neatly faced up with slabs of snow, which was then covered with a thin layer of pine branches, to prevent them from melting by the heat of the body. At each end of the bed a pillar of snow was erected to place a lamp upon, and lastly, a porch was built before the door, and a piece of clear ice was placed in an aperture cut in the wall for a window.

The purity of the material of which the house was framed, the elegance of its construction, and the translucency of its walls, which transmitted a very pleasant light, gave it an appearance far superior to a marble building, and one might survey it with feelings some-what akin to those produced by the contemplation of a Grecian temple, reared by Phidias; both are triumphs of art, inimitable in their kinds.

Annexed there is a plan of a complete Esquimaux snow-house, with kitchen and other apartments, copied from a sketch made by Augustus, with the names of the different places affixed. The only fire-place is in the kitchen, the heat of the lamps sufficing to keep the other apartments warm.

Several deer were killed near the house, and we received some supplies from Akaitcho. Parties were also employed in bringing in the meat that was placed *en cache* in the early part of the winter. More than one half of these *caches*, however, had been destroyed by the wolves and wolverines; a circumstance which, in conjunction with the empty state of our store-house, led us to fear that we should be much straitened for provisions before the arrival of any considerable number of rein-deer in this neighbourhood.



A. *Ablokeyt*, steps.
B. *Pahlæuk*, porch.
C. *Wadl-leek*, passage.
D. *Haddnæweek*, for the reception of the sweepings of the house.
E. G. *Tokheuook*, ante-chamber, or passage.
F. *Annarræartoweek*.
H. *Eegah*, cooking-house.
I. *Eegah-natkah*, passage.
K. *Keidgewack*, for piling wood upon.
M. *Keek loot*, fire-place built of stone.
L. *Keek kloweyt*, cooking side.
N. *Eegloo*, house.
O. *Kattack*, door.
P. *Nattæuck*, clear space in the apartment.
a. d. *Eekput*, a kind of shelf, where the candle stands; and
b. c. a pit, where they throw their bones, and other offal of their provision.
Q. *Eegl-luck*, bed-place.
S. bed-place as on the other side.
R. *Eegleeteat*, bed-side, or sitting-place.
T. *Keitgn-nok*, small pantry.
U. *Hærgloack*, store-house for provisions.

A good many ptarmigan were seen at this time, and the women caught some in snares, but not in sufficient quantity to make any further alteration in the rations of deers' meat that were daily issued. They had already been reduced from eight, to the short allowance of five pounds.

Many wolves prowled nightly about the house, and even ventured upon the roof of the kitchen, which is a low building, in search of food. Keskarrah shot a very large white one, of which a beautiful and correct drawing was made by Mr. Hood.

The temperature in February was considerably lower than in the preceding month, although not so low as in December, the mean being — 25.3°. The greatest temperature was 1° above zero, and the lowest 51° below.

On the 5th of March the people returned from Slave Lake, bringing the remainder of our stores, consisting of a cask of flour, thirty-six pounds of sugar, a roll of tobacco, and forty pounds of tobacco. I received a letter from Mr. Weeks, wherein he denied that he had ever circulated any reports to our disadvantage; and stated, that he had done every thing in his power to assist us, and even discouraged Akaitcho from leaving us, when he had sent him a message, saying, that he wished to do so, if he was sure of being well received at Fort Providence.

We mentioned the contents of the letter to the Indians, who were at the house at the time, when one of the hunters, who had attended the men on their journey, stated, that he had heard many of the reports against us from Mr. Weeks himself, and expressing his surprise that he should venture to deny them. St. Germain soon afterwards arrived from Akaitcho, and informed us, that he left him in good humour, and, apparently, not harbouring the slightest idea of quitting us.

On the 12th, we sent four men to Fort Providence; and, on the 17th, Mr. Back arrived from Fort Chipewyan, having performed,

since he left us, a journey of more than one thousand miles on foot. I had every reason to be much pleased with his conduct on this arduous undertaking; but his exertions may be best estimated by the perusal of the following narrative of his proceedings:—

On quitting Fort Enterprise, with Mr. Wentzel and two Canadians, accompanied by two hunters and their wives, our route lay across the barren hills. We saw, during the day, a number of deer, and, occasionally, a solitary white wolf; and in the evening halted near a small knot of pines. Owing to the slow progress made by the wives of the hunters, we only travelled the first day a distance of seven miles and a half. During the night we had a glimpse of the fantastic beauties of the Aurora Borealis, and were somewhat annoyed by the wolves, whose nightly howling interrupted our repose. Early the next morning we continued our march, sometimes crossing small lakes (which were just frozen enough to bear us), and at other times going large circuits, in order to avoid those which were open. The walking was extremely bad throughout the day; for, independent of the general unevenness of the ground, and the numberless large stones which lay scattered in every direction, the unusual warmth of the weather had dissolved the snow, which not only kept us constantly wet, but deprived us of a firm footing, so that the men, with their heavy burdens, were in momentary apprehension of falling. In the afternoon a fine herd of deer was descried, and the Indians, who are always anxious for the chase, and can hardly be restrained from pursuing every animal which they see, set out immediately. It was late when they returned, having had good success, and bringing with them five tongues, and the shoulder of a deer. We made about twelve miles this day. The night was fine, and the Aurora Borealis so vivid, that we imagined,

more than once, that we heard a rustling noise like that of autumnal leaves stirred by the wind; but after two hours of attentive listening, we were not entirely convinced of the fact. The coruscations were not so bright, nor the transition from one shape and colour to another so rapid, as they sometimes are; otherwise, I have no doubt, from the midnight silence which prevailed, that we should have ascertained this yet undecided point.

The morning of the 20th was so extremely hazy that we could not see ten yards before us; it was, therefore, late when we started, and during our journey the hunters complained of the weather, and feared they should lose the track of our route. Towards the evening it became so thick that we could not proceed, consequently we halted in a small wood, situated in a valley, after having only completed a distance of six miles.

The scenery consisted of high hills, which were almost destitute of trees, and lakes appeared in the valleys. The cracking of the ice was so loud during the night as to resemble thunder, and the wolves howled round us. We were now at the commencement of the woods, and at an early hour, on the 21st, continued our journey over high hills for three miles, when the appearance of some deer caused us to halt, and nearly the remainder of the day was passed in hunting them. In the evening we stopped within sight of Prospect Hill, after having killed and concealed six deer. A considerable quantity of snow fell during the night.

The surrounding country was extremely rugged; the hills divided by deep ravines, and the valleys covered with broken masses of rocks and stones; yet the deer fly (as it were,) over these impediments with apparent ease, seldom making a false step, and springing from crag to crag with all the safety of the mountain goat. After passing Rein-deer Lake, (where the ice was so thin as to bend at every step for nine miles,) we halted, perfectly satisfied with our escape from sinking into the water. While some of the party were forming the

encampment one of the hunters killed a deer, a part of which was concealed to be ready for use on our return. This evening we halted in a wood near the canoe track, after having travelled a distance of nine miles. The wind was S.E. and the night cloudy, with wind and rain.

On the 24th and 25th we underwent some fatigue from being obliged to go round the lakes, which lay across our route, and were not sufficiently frozen to bear us. Several rivulets appeared to empty themselves into the lakes, no animals were killed, and few tracks seen. The scenery consisted of barren rocks and high hills, covered with lofty pine, birch, and larch trees.

October 26.—We continued our journey, sometimes on frozen lakes, and at other times on high craggy rocks. When we were on the lakes we were much impeded in our journey by different parts which were unfrozen. There was a visible increase of wood, consisting of birch and larch, as we inclined to the southward. About ten A.M. we passed Icy Portage, where we saw various tracks of the moose, bear, and otter; and after a most harassing march through thick woods and over fallen trees, we halted a mile to the westward of Fishing Lake; our provisions were now almost expended; the weather was cloudy with snow.

On the 27th we crossed two lakes, and performed a circuitous route, frequently crossing high hills to avoid those lakes which were not frozen; during the day one of the women made a hole through the ice, and caught a fine pike, which she gave to us; the Indians would not partake of it, from the idea (as we afterwards learnt,) that we should not have sufficient for ourselves: "We are accustomed to starvation," said they, "but you are not." In the evening we halted near Rocky Lake. I accompanied one of the Indians to the summit of a hill, where he shewed me a dark horizontal cloud, extending to a considerable distance along the mountains in the perspective, which he said was occasioned by the Great Slave Lake, and was

considered as a good guide to all the hunters in the vicinity. On our return we saw two untenanted bears' dens.

The night was cloudy with heavy snow; yet the following morning we continued our tedious march, many of the lakes remained still open, the rocks high and covered with snow, which continued to fall all day, consequently we effected but a trifling distance, and that too with much difficulty. In the evening we halted; having only performed about seven miles. One of the Indians gave us a fish which he had caught, though he had nothing for himself; and it was with much trouble that he could be prevailed upon to partake of it. The night was cloudy with snow. On the 29th we set out through deep snow and thick woods; and after crossing two small lakes stopped to breakfast, sending the women on before, as they had already complained of lameness, and could not keep pace with the party. It was not long before we overtook them on the banks of a small lake, which though infinitely less in magnitude than many we had passed, yet had not a particle of ice on its surface. It was shoal, had no visible current, and was surrounded by hills. We had nothing to eat, and were not very near an establishment where food could be procured; however, as we proceeded, the lakes were frozen, and we quickened our pace, stopping but twice for the hunters to smoke. Nevertheless the distance we completed was but trifling, and at night we halted near a lake, the men being tired, and much bruised from constantly falling amongst thick broken woods and loose stones concealed under the snow. The night was blowing and hazy with snow.

On the 30th we set out with the expectation of gaining the Slave Lake in the evening; but our progress was again impeded by the same causes as before, so that the whole day was spent in forcing our way through thick woods and over swamps covered with snow. We had to walk over pointed and loose rocks, which sliding from under our feet, made our path dangerous, and often threw us down

several feet on sharp-edged stones lying beneath the snow. Once we had to climb a towering, and almost perpendicular, rock, which not only detained us, but was the cause of great anxiety for the safety of the women, who being heavily laden with furs, and one of them with a child on her back, could not exert themselves with the activity which such a task required. Fortunately nothing serious occurred, though one of them once fell with considerable violence. During the day one of the hunters broke through the ice, but was soon extricated; when it became dark we halted near the Bow String Portage, greatly disappointed at not having reached the lake. The weather was cloudy, accompanied with thick mist and snow. The Indians expected to have found here a bear in its den, and to have made a hearty meal of its flesh; indeed it had been the subject of conversation all day, and they had even gone so far as to divide it, frequently asking me what part I preferred; but when we came to the spot—oh! lamentable! it had already fallen a prey to the devouring appetites of some more fortunate hunters, who had only left sufficient evidence that such a thing had once existed. One of our men, however, caught a fish, which with the assistance of some weed scraped from the rocks, (*tripe de roche*,) which forms a glutinous substance, made us a tolerable supper; it was not of the most choice kind, but yet good enough for hungry men. While we were eating it I perceived one of the women busily employed scraping an old skin, the contents of which her husband presented us with. They consisted of pounded meat, fat, and a greater proportion of Indians' and deers' hair than either; and though such a mixture may not appear very alluring to an English stomach, it was thought a great luxury after three days' privation in these cheerless regions of America. Indeed had it not been for the precaution and generosity of the Indians, we must have gone without sustenance until we had reached the fort.

On the 1st of November our men began to make a raft to enable us to cross a river which was not even frozen at the edges. It was soon finished, and three of us embarked, being seated up to the ancles in water. We each took a pine branch for a paddle, and made an effort to gain the opposite shore, in which, after some time, (and not without strong apprehensions of drifting into the Slave Lake,) we succeeded. In two hours' time the whole party was over, with a comfortable addition to it in the shape of some fine fish, which the Indians had caught; of course we did not forget to take these friends with us, and after passing several lakes, to one of which we saw no termination, we halted within eight miles of the fort. The Great Slave Lake was not frozen.

In crossing a narrow branch of the lake I fell through the ice, but received no injury; and at noon we arrived at Fort Providence, and were received by Mr. Weeks, a clerk of the North-West Company, and in charge of the establishment. I found several packets of letters for the officers, which I was desirous of sending to them immediately; but as the Indians and their wives complained of illness and inability to return before they had rested, a flagon of mixed spirits was given them, and their sorrows were soon forgotten, and in a quarter of an hour they pronounced themselves excellent hunters, and capable of going any where; however, their boasting ceased with the last drop of the bottle, when a crying scene took place, which would have continued half the night, had not the magic of an additional quantity of spirits dried their tears, and once more turned their mourning into joy. It was a satisfaction to me to behold these poor creatures enjoying themselves, for they had behaved in the most exemplary and active manner towards the party, and with a generosity and sympathy seldom found even in the more civilized parts of the world; and the attention and affection which they manifested towards their wives,

evinced a benevolence of disposition and goodness of nature which could not fail to secure the approbation of the most indifferent observer.

The accounts I here received of our goods were of so unsatisfactory a nature, that I determined to proceed, as soon as the lake was frozen, to Moose-Deer Island, or if necessary to the Athabasca Lake; both to inform myself of the grounds of the unceremonious and negligent manner in which the Expedition had been treated, and to obtain a sufficient supply of ammunition and other stores, to enable it to leave its present situation, and proceed for the attainment of its ultimate object.

November 9.—I despatched to Fort Enterprise one of the men, with the letters and a hundred musquet-balls, which Mr. Weeks lent me on the condition that they should be returned the first opportunity. An Indian and his wife accompanied the messenger. Lieutenant Franklin was made acquainted with the exact state of things; and I awaited with much impatience the freezing of the lake.

November 16.—A band of Slave Indians came to the fort with a few furs and some bears' grease. Though we had not seen any of them, it appeared that they had received information of our being in the country; and knew the precise situation of our house, which they would have visited long ago, but from the fear they had of being pillaged by the Copper Indians. I questioned the chief about the Great Bear and Martin Lakes, their distance from Fort Enterprise, &c.; but his answers were so vague and unsatisfactory that they were not worth attention; his description of Bouleau's Route, (which he said was the shortest and best, and abundant in animals,) was very defective, though the relative points were sufficiently characteristic, had we not possessed a better route. He had never been at the sea; and knew nothing about the mouth of the Copper-Mine River. In the evening he made his young men dance, and

sometimes accompanied them himself. They had four feathers in each hand. When one commenced moving in a circular form, lifting both feet at the same time, similar to jumping sideways. After a short time a second and a third joined, and afterwards the whole band was dancing, some in a state of nudity, others half dressed, singing an unmusical wild air with (I suppose,) appropriate words; the particular sounds of which were, ha! ha! ha! uttered vociferously, and with great distortion of countenance, and peculiar attitude of body, the feathers being always kept in a tremulous motion. The ensuing day I made the chief acquainted with the object of our mission, and recommended him to keep at peace with his neighbouring tribes, and to conduct himself with attention and friendship towards the whites. I then gave him a medal, telling him it was the picture of the King, whom they emphatically term "their Great Father."

November 18.—We observed two mock moons at equal distances from the central one; and the whole were encircled by a halo: the colour of the inner edge of the large circle was a light red, inclining to a faint purple.

November. 20—Two parhelia were observable with a halo; the colours of the inner edge of the circle were a bright carmine and red lake, intermingled with a rich yellow, forming a purplish orange; the outer edge was pale gamboge.

December 5.—A man was sent some distance on the lake, to see if it was sufficiently frozen for us to cross. I need scarcely mention my satisfaction, when he returned with the pleasing information that it was.

December 7.—I quitted Fort Providence, being accompanied by Mr. Wentzel, Beauparlant, and two other Canadians, provided with dogs and sledges. We proceeded along the borders of the lake, occasionally crossing deep bays; and at dusk encamped at the *Gros Cap*, having proceeded a distance of twenty-five miles.

Drawn by Lieut.t Back R.N.

Engraved by Edw.d Finden.

WINTER TRAVELLING ON GREAT SLAVE LAKE.

Published March 1823 by John Mur

December 8.—We set out on the lake with an excessively cold north-west wind, and were frequently interrupted by large pieces of ice which had been thrown up by the violence of the waves during the progress of congelation, and at dusk we encamped on the Rein-deer Islands.

The night was fine, with a faint Aurora Borealis. Next day the wind was so keen, that the men proposed conveying me in a sledge that I might be the less exposed, to which, after some hesitation, I consented. Accordingly a rein-deer skin and a blanket were laid along the sledge, and in these I was wrapped tight up to the chin, and lashed to the vehicle, with just leaving sufficient play for my head to perceive when I was about to be upset on some rough projecting piece of ice. Thus equipped, we set off before the wind (a favourable circumstance on a lake), and went on very well until noon; when the ice being driven up in ridges, in such a manner as to obstruct us very much, I was released; and I confess not unwillingly, though I had to walk the remainder of the day.

There are large openings in many parts where the ice had separated; and in attempting to cross one of them, the dogs fell into the water, and were saved with difficulty. The poor animals suffered dreadfully from the cold, and narrowly escaped being frozen to death. We had quickened our pace towards the close of the day, but could not get sight of the land; and it was not till the sun had set that we perceived it about four miles to our left, which obliged us to turn back, and head the wind. It was then so cold, that two of the party were frozen almost immediately about the face and ears. I escaped, from having the good fortune to possess a pair of gloves made of rabbits-skin, with which I kept constantly chafing the places which began to be affected. At six P.M. we arrived at the fishing-huts near Stoney Island, and remained there the night. The Canadians were not a little surprised at seeing us, whom they had already given up for lost—nor less so at the manner by which

we had come—for they all affirmed, that the lake near them was quite free from ice the day before.

December 10.—At an early hour we quitted the huts, lashed on sledges as before, with some little addition to our party; and at three hours thirty minutes P.M. arrived at the North-West Fort on Moose-Deer Island, where I was received by Mr. Smith, with whom I had been acquainted at the Athabasca. He said he partly expected me. The same evening I visited Messrs. M'Vicar and M'Aulay at Hudson's Bay Fort, when I found the reports concerning our goods were but too true, there being in reality but five packages for us. I also was informed that two Esquimaux, Augustus the chief, and Junius his servant, who had been sent from Fort Churchill by Governor Williams, to serve in the capacity of interpreters to the Expedition, were at the Fort. The men were short of stature but muscular, apparently good-natured, and perfectly acquainted with the purpose for which they were intended. They had built themselves a snow-house on an adjacent island, where they used frequently to sleep. The following day I examined the pieces, and to my great disappointment found them to consist of three kegs of spirits, already adulterated by the voyagers who had brought them; a keg of flour, and thirty-five pounds of sugar, instead of sixty. The ammunition and tobacco, the two most essential requisites, were left behind.

I lost no time in making a demand from both parties; and though their united list did not furnish the half of what was required, yet it is possible that every thing was given by them which could be spared consistent with their separate interests, particularly by Mr. M'Vicar, who, in many articles, gave me the whole he had in his possession. These things were sent away immediately for Fort Enterprise, when an interpreter arrived with letters from Lieutenant Franklin, which referred to a series of injurious reports said to have been propagated against us by some one at Fort Providence.

Finding a sufficiency of goods could not be provided at Moose-Deer Island, I determined to proceed to the Athabasca Lake, and ascertain the inclinations of the gentlemen there. With this view I communicated my intentions to both parties; but could only get dogs enough from the North-West Company to carry the necessary provisions for the journey. Indeed Mr. Smith informed me plainly he was of opinion that nothing could be spared at Fort Chipewyan; that goods had never been transported so long a journey in the winter season, and that the same dogs could not possibly go and return; besides, it was very doubtful if I could be provided with dogs there; and finally, that the distance was great, and would take sixteen days to perform it. He added, that the provisions would be mouldy and bad, and that, from having to walk constantly on snow-shoes, I should suffer a great deal of misery and fatigue. Notwithstanding these assertions, on the 23d of December I left the Fort, with Beauparlant and a Bois-brulé, each having a sledge drawn by dogs, laden with pemmican. We crossed an arm of the lake, and entered the Little Buffalo River, which is connected with the Salt River, and is about fifty yards wide at its junction with the lake—the water is brackish. This route is usually taken in the winter, as it cuts off a large angle in going to the Great Slave River. In the afternoon we passed two empty fishing-huts, and in the evening encamped amongst some high pines on the banks of the river, having had several snow showers during the day, which considerably impeded the dogs, so that we had not proceeded more than fifteen miles.

December 24 and 25.—We continued along the river, frequently making small portages to avoid going round the points, and passed some small canoes, which the Indians had left for the winter. The snow was so deep that the dogs were obliged to stop every ten minutes to rest themselves; and the cold so excessive, that both the men were badly frozen on both sides of the face and chin. At length, having come to a long meadow, which the dogs could not

cross that night, we halted in an adjoining wood, and were presently joined by a Canadian, who was on his return to the Fort, and who treated us with some fresh meat in exchange for some pemmican. During the latter part of the day we had seen numerous tracks of the moose buffalo and marten.

December 26.—The weather was so cold that we were compelled to run to prevent ourselves from freezing; our route lay across some large meadows which appeared to abound in animals, though the Indians around Slave Lake are in a state of great want. About noon we passed a sulphur-stream, which ran into the river; it appeared to come from a plain about fifty yards distant. There were no rocks near it, and the soil through which it took its course was composed of a reddish clay. I was much galled by the strings of the snow-shoes during the day, and once got a severe fall, occasioned by the dogs running over one of my feet, and dragging me some distance, my snow-shoe having become entangled with the sledge. In the evening we lost our way, from the great similarity of appearance in the country, and it was dark before we found it again, when we halted in a thick wood, after having come about sixteen miles from the last encampment. Much snow fell during the night.

At an early hour on the 27th of December, we continued our journey along the surface of a long but narrow lake, and then through a wood, which brought us to the *grand detour* on the Slave River. The weather was extremely cloudy, with occasional falls of snow, which tended greatly to impede our progress, from its gathering in lumps between the dogs' toes; and though they did not go very fast, yet my left knee pained me so much, that I found it difficult to keep up with them. At three P.M. we halted within nine miles of the Salt River, and made a hearty meal of mouldy pemmican.

December 28 and 29.—We had much difficulty in proceeding, owing to the poor dogs being quite worn out, and their feet perfectly raw. We endeavoured to tie shoes on them, to afford them

some little relief, but they continually came off when amongst deep snow, so that it occupied one person entirely to look after them. In this state they were hardly of any use amongst the steep ascents of the portages, when we were obliged to drag the sledges ourselves. We found a few of the rapids entirely frozen. Those that were not had holes and large spaces about them, from whence issued a thick vapour, and in passing this we found it particularly cold; but what appeared most curious was the number of small fountains which rose through the ice, and often rendered it doubtful which way we should take. I was much disappointed at finding several falls (which I had intended to sketch) frozen almost even with the upper and lower parts of the stream; the ice was connected by a thin arch, and the rushing of the water underneath might be heard at a considerable distance from the place. On the banks of these rapids there was a constant overflowing of the water, but in such small quantities as to freeze before it had reached the surface of the central ice, so that we passed between two ridges of icicles, the transparency of which was beautifully contrasted by the flakes of snow and the dark green branches of the over-hanging pine.

Beauparlant complained bitterly of the cold whilst among the rapids, but no sooner had he reached the upper part of the river than he found the change of the temperature so great, that he vented his indignation against the heat.—"Mais c'est terrible," said he, to be frozen and sun-burnt in the same day. The poor fellow, who had been a long time in the country, regarded it as the most severe punishment that could have been inflicted on him, and would willingly have given a part of his wages rather than this disgrace had happened; for there is a pride amongst "Old Voyagers," which makes them consider the state of being frost-bitten as effeminate, and only excusable in a "Pork-eater," or one newly come into the country. I was greatly fatigued, and suffered acute pains in the

knees and legs, both of which were much swollen when we halted a little above the Dog River.

December 30 and 31.—Our journey these days was by far the most annoying we had yet experienced; but, independent of the vast masses of ice that were piled on one another, as well as the numerous open places about the rapids (and they did not a little impede us), there was a strong gale from the north-west, and so dreadfully keen, that our time was occupied in rubbing the frozen parts of the face, and in attempting to warm the hands, in order to be prepared for the next operation. Scarcely was one place cured by constant friction than another was frozen; and though there was nothing pleasant about it, yet it was laughable enough to observe the dexterity which was used in changing the position of the hand from the face to the mitten, and *vice versâ*. One of the men was severely affected, the whole side of his face being almost raw. Towards sunset I suffered so much in my knee and ancle, from a recent sprain, that it was with difficulty I could proceed with snow-shoes to the encampment on the Stoney Islands. But in this point I was not singular; for Beauparlant was almost as bad, and without the same cause.

1821. January 1. We set out with a quick step, the wind still blowing fresh from the north-west, which seemed in some measure to invigorate the dogs; for towards sunset they left me a considerable distance behind. Indeed my legs and ancles were now so swelled, that it was excessive pain to drag the snow-shoes after me. At night we halted on the banks of Stoney River, when I gave the men a glass of grog, to commemorate the new year; and the next day, January 2, we arrived at Fort Chipeywan, after a journey of ten days and four hours —the shortest time in which the distance had been done at the same season of the year. I found Messrs. G. Keith and S. M'Gilliway in charge of the fort, who were not a little surprised to see me. At

the commencement of the new year is the rejoicing season of the Canadians, when they are generally intoxicated a few days. I postponed making any demand till this time of festivity should cease; but on the same day I went over to the Hudson's Bay Fort, and delivered Lieutenant Franklin's letters to Mr. Simpson. If they were astonished at one side to see me, the amazement was still greater on the other; for reports were so far in advance, that we were said to have already fallen by the spears of the Esquimaux.

January 3.—I made a demand from both parties for supplies; such as ammunition, gun-flints, axes, files, clothing, tobacco, and spirits. I stated to them our extreme necessity, and that without their assistance the Expedition must be arrested in its progress. The answer from the North-West gentlemen was satisfactory enough; but on the Hudson Bay side I was told, " that any farther assistance this season entirely depends on the arrival of supplies, expected in a few weeks hence from a distant establishment." I remained at Fort Chipewyan five weeks, during which time some laden sledges did arrive, but I could not obtain any addition to the few articles I had procured at first. A packet of letters for us, from England, having arrived, I made preparations for my return, but not before I had requested both Companies to send, next year, from the depôts a quantity of goods for our use, specified in lists furnished to them.

The weather, during my abode at Chipewyan, was generally mild, with occasional heavy storms, the greater part of which was generally anticipated by the activity of the Aurora Borealis; and this I observed had been the case between Fort Providence and the Athabasca in December and January, though not invariably so in other parts of the country. One of the partners of the North-West Company related to me the following singular story:—" He was travelling in a canoe in the English River, and had landed near the Kettle Fall, when the coruscations of the Aurora Borealis were

so vivid and low, that the Canadians fell on their faces, and began praying and crying, fearing they should be killed; he himself threw away his gun and knife, that they might not attract the flashes, for they were within two feet from the earth, flitting along with incredible swiftness, and moving parallel to its surface. They continued for upwards of five minutes, as near as he could judge, and made a loud rustling noise, like the waving of a flag in a strong breeze. After they had ceased, the sky became clear, with little wind."

February 9.—Having got every thing arranged, and having had a hearty breakfast (with a coup de l'eau de vie, a custom amongst the traders), I took my departure, or rather attempted to do so, for on going to the gate there was a long range of women, who came to bid me farewell. They were all dressed (after the manner of the country) in blue or green cloth, with their hair fresh greased, separated before, and falling down behind, not in careless tresses, but in a good sound tail, fastened with black tape or riband. This was considered a great compliment, and the ceremony consisted in embracing the whole party.

I had with me four sledges, laden with goods for the Expedition, and a fifth one belonging to the Hudson's Bay Company. We returned exactly by the same route, suffering no other inconvenience but that arising from the chafing of the snow-shoe, and bad weather. Some Indians, whom we met on the banks of the Little Buffalo River, were rather surprised at seeing us, for they had heard that we were on an island, which was surrounded by Esquimaux. The dogs were almost worn out, and their feet raw, when, on February the 20th, we arrived at Moose-deer Island with our goods all in good order. Towards the end of the month two of our men arrived with letters from Lieutenant Franklin, containing some fresh demands, the major part of which I was fortunate enough to procure without the least trouble. Having arranged the accounts and

receipts between the Companies and the Expedition, and sent every thing before me to Fort Providence, I prepared for my departure; and it is but justice to the gentlemen of both parties at Moose-Deer Island to remark, that they afforded the means of forwarding our stores in the most cheerful and pleasant manner.

March 5.—I took leave of the gentlemen at the forts, and, in the afternoon, got to the fisheries near Stoney Island, where I found Mr. M'Vicar, who was kind enough to have a house ready for my reception; and I was not a little gratified at perceiving a pleasant looking girl employed in roasting a fine joint, and afterwards arranging the table with all the dexterity of an accomplished servant.

March 6.—We set out at day-light, and breakfasted at the Rein-deer Islands. As the day advanced the heat became so oppressive, that each pulled off his coat and ran till sunset, when we halted with two men, who were on their return to Moose-Deer Island. There was a beautiful Aurora Borealis in the night; it rose about N.b.W., and divided into three bars, diverging at equal distances as far as the zenith, and then converging until they met in the opposite horizon; there were some flashes at right angles to the bars.

March 7.—We arrived at Fort Providence, and found our stores safe and in good order. There being no certainty when the Indian, who was to accompany me to our house, would arrive, and my impatience to join my companions increasing as I approached it, after making the necessary arrangements with Mr. Weeks respecting our stores, on March the 10th I quitted the fort, with two of our men, who had each a couple of dogs and a sledge laden with provision. On the 13th we met the Indian, near Icy Portage, who was sent to guide me back. On the 14th we killed a deer, and gave the dogs a good feed; and, on the 17th, at an early hour, we arrived at Fort Enterprise, having travelled about eighteen miles a-day. I had the pleasure of meeting my friends all in good

health, after an absence of nearly five months, during which time I had travelled one thousand one hundred and four miles, on snow shoes, and had no other covering at night, in the woods, than a blanket and deer-skin, with the thermometer frequently at — 40°, and once at — 57°; and sometimes passing two or three days without tasting food.

CHAPTER VIII.

Continuation of Proceedings at Fort Enterprise—Some Account of Copper Indians—Preparations for the Journey to the Northward.

1821. March 18. I SHALL now give a brief account of the Copper Indians, termed by the Chipewyans, *Tantsawhot-dinneh*, or Birch-rind Indians. They were originally a tribe of the former people, and, according to their own account, inhabited the south side of Great Slave Lake, at no very distant period. Their language, traditions, and customs, are essentially the same with those of the Chipewyans, but in personal character they have greatly the advantage of that people; a circumstance which is to be attributed, probably, to local causes, perhaps to their procuring their food more easily and in greater abundance. They hold women in the same low estimation as the Chipewyans do, looking upon them as a kind of property, which the stronger may take from the weaker, whenever there is just reason for quarrelling, if the parties are of their own nation, or whenever they meet, if the weaker party are Dog-ribs or other strangers. They suffer, however, the kinder affections to shew themselves occasionally; they, in general, live happily with their wives, the women are contented with their lot, and we witnessed several instances of strong attachment. Of their kindness to strangers we are fully qualified to speak; their love of property, attention to their interests, and fears for the future, made them occasionally clamorous and unsteady; but their delicate and humane attention to us, in a season of great distress, at a future

period, are indelibly engraven on our memories. Of their notions of a Deity, or future state, we never could obtain any satisfactory account; they were unwilling, perhaps, to expose their opinions to the chance of ridicule. Akaitcho generally evaded our questions on these points, but expressed a desire to learn from us, and regularly attended Divine Service during his residence at the fort, behaving with the utmost decorum.

This leader, indeed, and many others of his tribe, possessed a laudable curiosity, which might easily be directed to the most important ends; and I believe, that a well-conducted Christian mission to this quarter could not fail of producing the happiest effect. Old Keskarrah alone used boldly to express his disbelief of a Supreme Deity, and state that he could not credit the existence of a Being, whose power was said to extend every where, but whom he had not yet seen, although he was now an old man. The old sceptic is not a little conceited, as the following exordium to one of his speeches evinces: "It is very strange that I never meet with any one who is equal in sense to myself." The same old man, in one of his communicative moods, related to us the following tradition: The earth had been formed, but continued enveloped in total darkness, when a bear and a squirrel met on the shores of a lake; a dispute arose as to their respective powers, which they agreed to settle by running in opposite directions round the lake, and which ever arrived first, was to evince his superiority by some signal act of power. The squirrel beat, ran up a tree, and loudly demanded light, which instantly beaming forth, discovered a bird dispelling the gloom with its wings; the bird was afterwards recognised to be a crow. The squirrel next broke a piece of bark from the tree, endowed it with the power of floating, and said, Behold the material which shall afford the future inhabitants of the earth the means of traversing the waters.

The Indians are not the first people who have ascribed the origin

of nautics to the ingenuity of the squirrel. The Copper Indians consider the bear, otter, and other animals of prey, or rather some kind of spirits which assume the forms of these creatures, as their constant enemies, and the cause of every misfortune which attends them; and in seasons of difficulty or sickness they alternately deprecate and abuse them.

Few of this nation have more than one wife at a time, and none but the leaders have more than two. Akaitcho has three, and the mother of his only son is the favourite. They frequently marry two sisters, and there is no prohibition to the intermarriage of cousins, but a man is restricted from marrying his niece.

The last war excursion they made against the Esquimaux was about ten years ago, when they destroyed about thirty persons, at the mouth of what they term Stoney-Point River, not far from the mouth of the Copper-Mine River. They now seem desirous of being on friendly terms with that persecuted nation, and hope, through our means, to establish a lucrative commerce with them. Indeed, the Copper Indians are sensible of the advantages that would accrue to them, were they made the carriers of goods between the traders and Esquimaux.

At the time of Hearne's visit, the Copper Indians being unsupplied with fire-arms, were oppressed by the Chipewyans; but even that traveller had occasion to praise their kindness of heart. Since they have received arms from the traders, the Chipewyans are fearful of venturing upon their lands; and all of that nation, who frequent the shores of Great Slave Lake, hold the name of Akaitcho in great respect. The Chipewyans have no leader of equal authority amongst themselves.

The number of the Copper Indians may be one hundred and ninety souls, *viz.*, eighty men and boys, and one hundred and ten women and young children. There are forty-five hunters in the

tribe. The adherents of Akaitcho amount to about forty men and boys; the rest follow a number of minor chiefs.

For the following notices of the nations on Mackenzie's River, we are principally indebted to Mr. Wentzel, who resided for many years in that quarter.

The *Thlingcha-dinneh*, or Dog-ribs, or, as they are sometimes termed after the Crees, who formerly warred against them, *Slaves*, inhabit the country to the westward of the Copper Indians, as far as Mackenzie's River. They are of a mild, hospitable, but rather indolent, disposition. They spend much of their time in amusements, and are fond of singing and dancing. In this respect, and in another, they differ very widely from most of the other Aborigines of North America. I allude to their kind treatment of the women. The men do the laborious work, whilst their wives employ themselves in ornamenting their dresses with quill work, and in other occupations suited to their sex. Mr. Wentzel has often known the young married men to bring specimens of their wives' needlework to the forts, and exhibit them with much pride. Kind treatment of the fair sex being usually considered as an indication of considerable progressive civilization, it might be worth while to inquire how it happens, that these people have stept so far beyond their neighbours. They have had, undoubtedly, the same common origin with the Chipewyans, for their languages differ only in accent, and their mode of life is essentially the same. We have not sufficient data to prosecute the inquiry with any hope of success, but we may recall to the reader's memory what was formerly mentioned, that the Dog-ribs say they came from the westward, whilst the Chipewyans say that they migrated from the eastward.

When bands of Dog-ribs meet each other after a long absence, they perform a kind of dance. A piece of ground is cleared for the purpose, if it is winter of the snow, or if summer of the bushes; and

the dance frequently lasts for two or three days, the parties relieving each other as they get tired. The two bands commence the dance with their backs turned to each other, the individuals following one another in Indian file, and holding the bow in the left hand and an arrow in the right. They approach obliquely, after many turns, and when the two bands are closely back to back, they feign to see each other for the first time, and the bow is instantly transferred to the right hand, and the arrow to the left, signifying that it is not their intention to use them against their friends. At a fort they use feathers instead of bows. The dance is accompanied with a song. These people are the dancing-masters of the country. The Copper Indians have neither dance nor music but what they borrow from them. On our first interview with Akaitcho, at Fort Providence, he treated us, as has already been mentioned, with a representation of the Dog-rib dance; and Mr. Back, during his winter journey, had an opportunity of observing it performed by the Dog-ribs themselves.

The chief tribe of the Dog-rib nation, termed Horn Mountain Indians, inhabit the country betwixt Great Bear Lake, and the west end of Great Slave Lake. They muster about two hundred men and boys capable of pursuing the chase. Small detachments of the nation frequent Marten Lake, and during the summer hunt in the neighbourhood of Fort Enterprise. Indeed this part of the country was formerly exclusively theirs, and most of the lakes and remarkable hills bear the names which they imposed upon them. As the Copper Indians generally pillage them of their women and furs when they meet, they endeavour to avoid them, and visit their ancient quarters on the barren grounds only by stealth.

Immediately to the northward of the Dog-ribs, on the north side of Bear Lake River, are the *Kawcho-dinneh*, or Hare Indians, who also speak a dialect of the Chipewyan language, and have much of the same manners with the Dog-ribs, but are considered both by them and by the Copper Indians, to be great conjurers. These

people report that in their hunting excursions to the northward of Great Bear Lake they meet small parties of Esquimaux.

Immediately to the northward of the Hare Indians, on both banks of Mackenzie's River, are the *Tykothee-dinneh*, Loucheux, Squint-Eyes, or Quarrellers. They speak a language distinct from the Chipewyan. They war often with the Esquimaux at the mouth of Mackenzie's River, but have occasionally some peaceable intercourse with them, and it would appear that they find no difficulty in understanding each other, there being considerable similarity in their languages. Their dress also resembles the Esquimaux, and differs from that of the other inhabitants of Mackenzie's River. The Tykothee-dinneh trade with Fort Good-Hope, situated a considerable distance below the confluence of Bear Lake River with Mackenzie's River, and as the traders suppose, within three days' march of the Arctic Sea. It is the most northern establishment of the North-West Company, and some small pieces of Russian copper coin once made their way thither across the continent from the westward. Blue or white beads are almost the only articles of European manufacture coveted by the Loucheux. They perforate the septum of the nose, and insert in the opening three small shells which they procure at a high price from the Esquimaux.

On the west bank of Mackenzie's River there are several tribes who speak dialects of the Chipewyan language, that have not hitherto been mentioned. The first we came to, on tracing the river to the southward from Fort Good-Hope, are the *Ambawtawhoot-dinneh*, or Sheep Indians. They inhabit the rocky mountains near the sources of the Dawhoot-dinneh River which flows into Mackenzie's, and are but little known to the traders. Some of them have visited Fort Good-Hope. A report of their being cannibals may have originated in an imperfect knowledge of them.

Some distance to the southward of this people are the Rocky Mountain Indians, a small tribe which musters about forty men and

boys capable of pursuing the chase. They differ but little from the next we are about to mention, the *Edchawtawhoot-dinneh*, Strong-bow, Beaver, or Thick-wood Indians, who frequent the *Rivière aux Liards*, or south branch of Mackenzie's River. The Strong-bows resemble the Dog-ribs somewhat in their disposition; but when they meet they assume a considerable degree of superiority over the latter, who meekly submit to the haughtiness of their neighbours. Until the year 1813, when a small party of them from some unfortunate provocation, destroyed Fort Nelson on the *Rivière aux Liards*, and murdered its inmates, the Strong-bows were considered to be a friendly and quiet tribe, and esteemed as excellent hunters. These people take their names, in the first instance, from their dogs. A young man is the father of a certain dog, but when he is married, and has a son, he styles himself the father of the boy. The women have a habit of reproving the dogs very tenderly when they observe them fighting,—"Are you not ashamed," say they, "are you not ashamed to quarrel with your little brother?" The dogs appear to understand the reproof and sneak off.

The Strong-bows, and Rocky-Mountain Indians, have a tradition in common with the Dog-ribs, that they came originally from the westward, from a level country, where there was no winter, which produced trees, and large fruits, now unknown to them. It was inhabited also by many strange animals, amongst which there was a small one whose visage bore a striking resemblance to the human countenance. During their residence in this land, their ancestors were visited by a man who healed the sick, raised the dead, and performed many other miracles, enjoining them at the same time to lead good lives, and not to eat of the entrails of animals, nor to use the brains for dressing skins until after the third day; and never to leave the skull of deer upon the ground within the reach of dogs and wolves, but to hang them carefully upon trees. No one knew from whence this good man came, or whither he went. They were

driven from that land by the rising of the waters, and following the tracks of animals on the sea-shore, they directed their course to the northward. At length they came to a strait, which they crossed upon a raft, but the sea has since frozen, and they have never been able to return. These traditions are unknown to the Chipewyans.

The number of men and boys of the Strong-bow nation, who are capable of hunting, may amount to seventy.

There are some other tribes who also speak dialects of the Chipewyan, upon the upper branches of the Rivière aux Liards, such as the Nohhannies and the *Tsillawhawdoot-dinneh*, or Brush-wood Indians. They are but little known, but the latter are supposed occasionally to visit some of the establishments on Peace River.

Having now communicated as briefly as I could the principal facts that came to our knowledge regarding the Indians in this quarter, I shall resume the narrative of events at Fort Enterprise.—The month of March proved fine. The thermometer rose once to 24° degrees above zero, and fell upon another day 49° below zero, but the mean was 11′ 57″.

On the 23d the last of our winter's stock of deers' meat was expended, and we were compelled to issue a little pounded meat which we had reserved for making pemmican for summer use. Our nets, which were set under the ice on the 15th, produced only two or three small fish daily. Amongst these was the round fish, a species of salmo, which we had not seen previously.

On the following day two Indians came with a message from the Hook, the chief next to Akaitcho in authority amongst the Copper Indians. His band was between West Marten and Great Bear Lakes, and he offered to provide a quantity of dried meat for us on the banks of the Copper-Mine River in the beginning of summer, provided we sent him some goods and ammunition. It was in his power to do this without inconvenience, as he generally spends the

summer months on the banks of the river near the Copper Mountain; but we had no goods to spare, and I could not venture to send any part of our small stock of ammunition until I saw what the necessities of our own party required. I told them, however, that I would gladly receive either provisions or leather when we met, and would pay for them by notes on the North-West Company's post; but, to prevent any misunderstanding with Mr. Weeks, I requested them to take their winter's collection of furs to Fort Providence before they went to the Copper-Mine River. They assured me that the Hook would watch anxiously for our passing, as he was unwell, and wished to consult the doctor.

Several circumstances having come lately to my knowledge that led me to suspect the fidelity of our interpreters, they were examined upon this subject. It appeared that in their intercourse with the Indians they have contracted very fearful ideas of the danger of our enterprise, which augment as the time of our departure draws near, and have not hesitated to express their dislike to the journey in strong terms amongst the Canadians, who are accustomed to pay much deference to the opinions of an interpreter. But this is not all; I had more than sufficient reason for suspecting that they had endeavoured to damp the exertions of the Indians, with the hope that the want of provision in the spring would put an end to our progress at once. St. Germain, in particular, had behaved in a very equivocal way, since his journey to Slave Lake. He denied the principal parts of the charge in a very dogged manner, but acknowledged that he had told the leader that we had not paid him the attention that a chief like him ought to have received; and that we had put a great affront on him in sending him only a small quantity of rum. An artful man like St. Germain, possessing as he did such a flow of language, and capable of saying even what he confessed to, had the means of poisoning the minds of the Indians without committing himself by any direct assertion that they could communicate;

and it is to be remarked, that unless Mr. Wentzel had possessed a competent knowledge of the Copper Indian language, we should not have learned what we did.

Although perfectly satisfied of his baseness, I could not dispense with his services; and I had no other resource but to give him a serious admonition, and desire him to return to his duty, after endeavouring to work upon his fears by an assurance, that I would certainly convey him to England for trial if the Expedition should be stopped through his fault. He replied, "It is immaterial to me where I lose my life, whether in England, or accompanying you to the sea, for the whole party will perish." After this discussion, however, he was more circumspect in his conduct.

On the 28th we received a small supply of meat from the Indian lodges. They have now moved into a lake, about twelve miles distant from us, in expectation of the deer coming soon to the northward.

On the 29th Akaitcho arrived at the house, having been sent for to make some arrangements respecting the procuring of provision, and that we might learn from him what his sentiments were with regard to accompanying us on our future journey. Next morning we had a conference, which I commenced by shewing him the charts and drawings that were prepared to be sent to England, and explaining fully our future intentions. He appeared much pleased at this mark of attention, and, when his curiosity was satisfied, began his speech by saying, that "although a vast number of idle rumours had been floating about the barren grounds during the winter," yet he was convinced that the representations that had been made to him at Fort Providence regarding the purport of the Expedition were perfectly correct. I next pointed out to him the necessity of our proceeding with as little delay as possible during the short period of the year that was fit for our operations, and that to do so it was requisite we should have a large supply

of provisions at starting. He instantly admitted the force of these observations, and promised that he and his young men should do their utmost to comply with our desires; and afterwards, in answer to my questions, informed us that he would accompany the Expedition to the mouth of the Copper-Mine River, or, if we did not meet with Esquimaux there for some distance along the coast, he was anxious, he said, to have an amicable interview with that people; and he further requested, that, in the event of our meeting with Dog-ribs on the Copper-Mine River, we should use our influence to persuade them to live on friendly terms with his tribe. We were highly pleased to find his sentiments so favourable to our views, and, after making some minor arrangements, we parted, mutually content with each other.

Akaitcho left us on the morning of the 31st, accompanied by Augustus, who, at his request, went to reside for a few days at his lodge.

On the 4th of April our men arrived with the last supply of goods from Fort Providence, the fruits of Mr. Back's arduous journey to the Athabasca Lake; and on the 17th Belanger *le gros* and Belanger *le rouge*, for so our men discriminated them, set out for Slave Lake, with a box containing the journals of the officers, charts, drawings, observations, and letters addressed to the Secretary of State for Colonial Affairs. They also conveyed a letter for Governor Williams, in which I requested that he would, if possible, send a schooner to Wager Bay with provisions and clothing, to meet the exigencies of the party, should they succeed in reaching that part of the coast.

Connoyer, who was much tormented with biliary calculi, and had done little or no duty all the winter, was discharged at the same time, and sent down in company with an Indian named the Belly.

The commencement of April was fine, and for several days a considerable thaw took place in the heat of the sun, which laying bare some of the lichens on the sides of the hills, produced a con-

sequent movement of the rein-deer to the northward, and induced the Indians to believe that the spring was already commencing. Many of them, therefore, quitted the woods, and set their snares on the barren grounds near Fort Enterprise. Two or three days of cold weather, however, towards the middle of the month, damped their hopes, and they began to say that another moon must elapse before the arrival of the wished-for season. In the mean time their premature departure from the woods, caused them to suffer from the want of food, and we were in some degree involved in their distress. We received no supplies from the hunters, our nets produced but very few fish, and the pounded meat which we had intended to keep for summer use was nearly expended. Our meals at this period were always scanty, and we were occasionally restricted to one in the day.

The Indian families about the house, consisting principally of women and children, suffered most. I had often requested them to move to Akaitcho's lodge, where they were more certain of receiving supplies; but as most of them were sick or infirm, they did not like to quit the house, where they daily received medicines from Dr. Richardson, to encounter the fatigue of following the movements of a hunting camp. They cleared away the snow on the site of the autumn encampments to look for bones, deers' feet, bits of hide, and other offal. When we beheld them knawing the pieces of hide, and pounding the bones, for the purpose of extracting some nourishment from them by boiling, we regretted our inability to relieve them, but little thought that we should ourselves be afterwards driven to the necessity of eagerly collecting these same bones a second time from the dunghill.

At this time, to divert the attention of the men from their wants, we encouraged the practice of sliding down the steep bank of the river upon sledges. These vehicles descended the snowy bank with much velocity, and ran a great distance upon the ice. The officers

joined in the sport, and the numerous overturns we experienced seemed to form no small share of the amusement of the party, but on one occasion, when I had been thrown from my seat and almost buried in the snow, a fat Indian woman drove her sledge over me, and sprained my knee severely.

On the 18th at eight in the evening a beautiful halo appeared round the sun when it was about 8° high. The colours were prismatic, and very bright, the red next the sun.

On the 21st the ice in the river was measured, and found to be five feet thick, and on the same day in setting the nets in Round Rock Lake, the ice there was ascertained to be six feet and a half thick, the water being six fathoms deep. The stomachs of some fish were at this time opened by Dr. Richardson, and found filled with insects which appear to exist in abundance under the ice during the winter.

On the 22nd a moose-deer was killed at the distance of forty-five miles, and Saint Germain went for it with a dog sledge, and returned with unusual expedition on the morning of the third day. This supply was soon exhausted, and we passed the 27th without eating, and had a prospect of fasting a day or two longer, when old Keskarrah entered with the unexpected intelligence of his having killed a deer. It was divided betwixt our own family and the Indians, and during the night a seasonable supply arrived from Akaitcho. Augustus returned with the men who brought it, much pleased with the attention he had received from the Indians during his visit to Akaitcho.

Next day Mr. Wentzel set out with every man that we could spare from the fort, for the purpose of bringing meat from the Indians as fast as it could be procured. Dr. Richardson followed them two days afterwards to collect specimens of the rocks in that part of the country. On the same day the two Belangers arrived from Fort Providence, having been only five days on the march from thence.

The highest temperature in April was + 40°, the lowest – 32°, the mean + 4.6°. The temperature of the rapid, examined on the 30th by Messrs. Back and Hood, was 32° at the surface, 33° at the bottom.

On the 7th of May Dr. Richardson returned from his excursion. He informed me that the rein-deer were again advancing to the northward, but that the leader had been joined by several families of old people, and that the daily consumption of provision at the Indian tents was consequently great. This information excited some painful apprehensions of being very scantily provided when the period for our departure should arrive.

The weather in the beginning of May was fine and warm. On the 2nd some patches of sandy ground near the house were cleared of snow. On the 7th the sides of the hills began to appear bare, and on the 8th a large house-fly was seen. This interesting event spread cheerfulness through our residence and formed a topic of conversation for the rest of the day.

On the 9th the approach of spring was still more agreeably confirmed by the appearance of a merganser and two gulls, and some loons, or arctic divers, at the rapid. This day to reduce the labour of dragging meat to the house, the women and children and all the men except four, were sent to live at the Indian tents.

The blue-berries, crow-berries, eye-berries, and cran-berries, which had been covered, and protected by the snow during the winter, might at this time be gathered in abundance, and proved indeed a valuable resource. The ground continued frozen, but the heat of the sun had a visible effect on the vegetation; the sap thawed in the pine-trees, and Dr. Richardson informed me that the mosses were beginning to shoot, and that the calyptræ of some of the jungermanniæ were already visible.

On the 11th Mr. Wentzel returned from the Indian lodges, having made the necessary arrangements with Akaitcho for the

drying of meat for summer use, the bringing of fresh meat to the fort, and the procuring a sufficient quantity of the resin of the spruce-fir, or as it is termed by the voyagers *gum*, for repairing the canoes previous to starting, and during the voyage. By my desire, he had promised payment to the Indian women who should bring in any of the latter article, and had sent several of our own men to the woods to search for it. At this time I communicated to Mr. Wentzel the mode in which I meant to conduct the journey of the approaching summer. Upon our arrival at the sea, I proposed to reduce the party to what would be sufficient to man two canoes, in order to lessen the consumption of provisions during our voyage, or journey along the coast; and as Mr. Wentzel had expressed a desire of proceeding no further than the mouth of the Copper-Mine River, which was seconded by the Indians, who wished him to return with them, I readily relieved his anxiety on this subject; the more so as I thought he might render greater service to us by making deposits of provision at certain points, than by accompanying us, through a country which was unknown to him, and amongst a people with whom he was totally unacquainted. My intentions were explained to him in detail, but they were of course to be modified by the circumstances that might occur.

On the 14th a robin appeared; this bird is considered by the natives as the infallible precursor of warm weather. Ducks and geese were also seen in numbers, and the rein-deer advanced to the northward. The merganser, which preys upon small fish, was the first of the duck tribe that appeared; next came the teal, (*anas crecca,*) which lives upon small insects that abound in the waters at this season; and lastly the goose, which feeds upon berries and herbage. Geese appear at Cumberland House, in latitude 54°, usually about the 12th of April; at Fort Chipewyan, in latitude 59°, on the 25th of April; at Slave Lake, in latitude 61°, on the 1st of May; and

at Fort Enterprise, in latitude 64° 28′, on the 12th or 14th of the same month.

On the 16th a minor chief amongst the Copper Indians, attended by his son, arrived from Fort Providence to consult Dr. Richardson. He was affected with snow-blindness, which soon yielded to the dropping of a little laudanum into his eyes twice a day. Most of our own men have been affected with the same complaint of late, but it has always yielded in twenty or thirty hours to the same remedy.

On the 21st all our men returned from the Indians, and Akaitcho was on his way to the fort. In the afternoon two of his young men arrived to announce his visit, and to request that he might be received with a salute and other marks of respect that he had been accustomed to on visiting Fort Providence in the spring. I complied with his desire although I regretted the expenditure of ammunition, and sent the young men away with the customary present of powder to enable him to return the salute, some tobacco, vermilion to paint their faces, a comb, and a looking-glass.

At eleven Akaitcho arrived ; upon the first notice of his appearance the flag was hoisted at the fort, and upon his nearer approach, a number of musquets were fired by a party of our people, and returned by his young men. Akaitcho, preceded by his standard-bearer, led the party, and advanced with a slow and solemn step to the door where Mr. Wentzel and I received him. The faces of the party were daubed with vermilion, the old men having a spot on the right cheek, the young ones on the left. Akaitcho himself was not painted. On entering he sat down on a chest, the rest placed themselves in a circle on the floor. The pipe was passed once or twice round, and in the mean time a bowl of spirits and water, and a present considerable for our circumstances of cloth, blankets, capots, shirts, &c., was placed on the floor for the chief's acceptance, and distri-

bution amongst his people. Akaitcho then commenced his speech, but I regret to say, that it was very discouraging, and indicated that he had parted with his good humour, at least since his March visit. He first inquired, whether in the event of a passage by sea being discovered, we should come to his lands in any ship that might be sent? And being answered, that it was probable but not quite certain, that some one amongst us might come; he expressed a hope that some suitable present should be forwarded to himself and nation; "for," said he, "the great Chief who commands where all the goods come from, must see from the drawings and descriptions of us and our country that we are a miserable people." I told him that he should assuredly be remembered, provided he faithfully fulfilled his engagement with us.

He next complained of the non-payment of my notes by Mr. Weeks, from whence he apprehended that his own reward would be withheld. "If," said he, "your notes to such a trifling amount are not accepted, whilst you are within such a short distance, and can hold communication with the fort, it is not probable that the large reward which has been promised to myself and party, will be paid when you are far distant, on your way to your own country. It really appears to me," he continued, "as if both of the Companies consider your party as a third company, hostile to their interests, and that neither of them will pay the notes you give to the Indians."

Afterwards, in the course of a long conference, he enumerated many other grounds of dissatisfaction; the principal of which were our want of attention to him as chief, the weakness of the rum formerly sent to him, the smallness of the present now offered to him, and the want of the chief's clothing, which he had been accustomed to receive at Fort Providence every spring. He concluded, by refusing to receive the goods now offered to him.

In reply to these complaints it was stated, that Mr. Weeks's

conduct could not be properly discussed at the distance we were from his fort; that no dependance ought to be placed on the vague reports that floated through the Indian territory; that, for our part, although we had heard many stories to his (Akaitcho's) disadvantage, we discredited them all; that the rum we had sent him, being what the great men in England were accustomed to drink, was of a milder kind, but, in fact, stronger than what he had been accustomed to receive; and that the distance we had come, and the speed with which we travelled, precluded us from bringing large quantities of goods like the traders; that this had been fully explained to him when he agreed to accompany us; and that, in consideration of his not receiving his usual spring outfit, his debts to the Company had been cancelled, and a present, much greater than any he had ever received before, ordered to be got ready for his return. He was further informed, that we were much disappointed in not receiving any dried meat from him, an article indispensable for our summer voyage, and which, he had led us to believe there was no difficulty in procuring; and that, in fact, his complaints were so groundless, in comparison with the real injury we sustained from the want of supplies, that we were led to believe they were preferred solely for the purpose of cloaking his own want of attention to the terms of his engagement. He then shifted his ground, and stated, that if we attempted to make a voyage along the sea-coast we would inevitably perish; and he advised us strongly against persisting in the attempt. This part of his harangue being an exact transcript of the sentiments formerly expressed by our interpreters, induced us to conclude that they had prompted his present line of conduct, by telling him, that we had goods or rum concealed. He afterwards received a portion of our dinner, in the manner he had been accustomed to do, and seemed inclined to make up matters with us in the course of the evening, provided we added to the present offered to him. Being told, however,

that this was impossible, since we had already offered him all the rum we had, and every article of goods we could spare from our own equipment, his obstinacy was a little shaken, and he made some concessions, but deferred giving a final answer, until the arrival of Humpy, his elder brother. The young men, however, did not choose to wait so long, and at night came for the rum, which we judged to be a considerable step towards a reconciliation.

St. Germain, the most intelligent of our two interpreters, and the one who had most influence with the Indians, being informed that their defection was, in a great measure, attributed to the unguarded conversations he had held with them, and which he had in part acknowledged, exerted himself much, on the following day, in bringing about a change in their sentiments, and with some success. The young men, though they declined hunting, conducted themselves with the same good humour and freedom as formerly. Akaitcho being, as he said, ashamed to shew himself, kept close in his tent all day.

On the 24th, one of the women, who accompanied us from Athabasca, was sent down to Fort Providence, under charge of the old chief, who came some days ago for medicine for his eyes. Angelique and Roulante, the other two women, having families, preferred accompanying the Indians, during their summer hunt. On the 25th, clothing, and other necessary articles, were issued to the Canadians as their equipment for the ensuing voyage. Two or three blankets, some cloth, iron work, and trinkets, were reserved for distribution amongst the Esquimaux on the sea-coast. Laced dresses were given to Augustus and Junius. It is impossible to describe the joy that took possession of the latter on the receipt of this present. The happy little fellow burst into ecstatic laughter, as he surveyed the different articles of his gay habiliments,

In the afternoon Humpy, the leader's elder brother; Annœthaiyazzeh, another of his brothers; and one of our guides, arrived

with the remainder of Akaitcho's band; as also Long-legs, brother to the Hook, with three of his band. There were now in the encampment, thirty hunters, thirty-one women, and sixty children, in all one hundred and twenty-one Indians of the Copper-Indian or Red-Knife tribe. The rest of the nation were with the Hook on the lower part of the Copper-Mine River.

Annœthai-yazzeh is remarkable amongst the Indians for the number of his descendants; he has eighteen children living, by two wives, of whom sixteen were at the fort at this time.

In the evening we had another formidable conference. The former complaints were reiterated, and we parted about midnight, without any satisfactory answer being given to my questions, as to when Akaitcho would proceed towards the River, and where he meant to make provision for our march. I was somewhat pleased, however, to find, that Humpy and Annœthai-yazzeh censured their brother's conduct, and accused him of avarice.

On the 26th the canoes were removed from the places where they had been deposited, as we judged that the heat of the atmosphere was now so great, as to admit of their being repaired without risk of cracking the bark. We were rejoiced to find that two of them had suffered little injury from the frost during the winter. The bark of the third one was considerably rent, but it was still capable of being repaired.

The Indians sat in conference in their tents all the morning; and, in the afternoon, came into the house, charged with fresh matter for discussion.

Soon after they had seated themselves, and the room was filled with the customary volume of smoke from their calumets, the goods which had been laid aside, were again presented to the leader; but he at once refused to distribute so small a quantity amongst his men, and complained that there were neither blankets, kettles, nor daggers, amongst them; and, in the warmth of his

anger, he charged Mr. Wentzel with having advised the distribution of all our goods to the Canadians, and thus defrauding the Indians of what was intended for them. Mr. Wentzel, of course, immediately repelled this injurious accusation, and reminded Akaitcho again, that he had been told, on engaging to accompany us, that he was not to expect any goods until his return. This he denied with an effrontery that surprised us all, when Humpy, who was present at our first interview at Fort Providence, declared that he heard us say, that no goods could be taken for the supply of the Indians on the voyage; and the first guide added, "I do not expect any thing here, I have promised to accompany the white people to the sea, and I will, therefore, go, confidently relying upon receiving the stipulated reward on my return." Akaitcho did not seem prepared to hear such declarations from his brothers, and instantly changed the subject, and began to descant upon the treatment he had received from the traders in his concerns with them, with an asperity of language that bore more the appearance of menace than complaint. I immediately refused to discuss this topic, as foreign to our present business, and desired Akaitcho to recall to his memory, that he had told me on our first meeting, that he considered me the father of every person attached to the expedition, in which character it was surely my duty to provide for the comfort and safety of the Canadians, as well as of the Indians. The voyagers, he knew, had a long journey to perform, and would, in all probability, be exposed to much suffering from cold, on a coast destitute of wood; and, therefore, required a greater provision of clothing than was necessary for the Indians, who, by returning immediately from the mouth of the river, would reach Fort Providence in August, and obtain their promised rewards. Most of the Indians appeared to assent to this argument, but Akaitcho said, "I perceive the traders have deceived you, you should have brought more goods, but I do not blame you." I then told him, that I

had brought from England only ammunition, tobacco, and spirits; and that, being ignorant what other articles the Indians required, we were dependent on the traders for supplies; but he must be aware, that every endeavour had been used on our parts to procure them, as was evinced by Mr. Back's journey to Fort Chipewyan. With respect to the ammunition and tobacco, we had been as much disappointed as themselves in not receiving them, but this was to be attributed to the neglect of those to whom they had been intrusted. This explanation seemed to satisfy him. After some minutes of reflection, his countenance became more cheerful, and he made inquiry, whether his party might go to either of the trading posts they chose on their return, and whether the Hudson's Bay Company were rich, for they had been represented to him as a poor people? I answered him, that we really knew nothing about the wealth of either Company, having never concerned ourselves with trade, but that all the traders appeared to us to be respectable. Our thoughts, I added, are fixed solely on the accomplishment of the objects for which we came to the country. Our success depends much on your furnishing us with provision speedily, that we may have all the summer to work in; and if we succeed, a ship will soon bring goods in abundance to the mouth of the Copper-Mine River. The Indians talked together for a short time after this conversation, and then the leader made an application for two or three kettles and some blankets to be added to the present to his young men; we were unable to spare him any kettles, but the officers promised to give a blanket each from their own beds.

Dinner was now brought in, and relieved us for a time from their importunity. The leading men, as usual, received each a portion from the table. When the conversation was resumed, the leader renewed his solicitations for goods, but it was now too palpable to be mistaken, that he aimed at getting every thing he possibly could, and leaving us without the means of making any presents to the

Esquimaux, or other Indians we might meet. I resolved, therefore, on steadily refusing every request that he should make at this time, and when he perceived that he could extort nothing more, he rose in an angry manner, and addressing his young men, said: "There are too few goods for me to distribute; those that mean to follow the white people to the sea may take them."

This was an incautious speech, as it rendered it necessary for his party to display their sentiments. The guides, and most of the hunters, declared their readiness to go, and came forward to receive a portion of the present, which was no inconsiderable assortment. This relieved a weight of anxiety from my mind, and I did not much regard the leader, retiring in a very dissatisfied mood.

The hunters then applied to Mr. Wentzel for ammunition, that they might go a hunting in the morning, and it was cheerfully given to them.

The officers and men amused themselves at prison-bars, and other Canadian games till two o'clock in the morning, and we were pleased to observe the Indians sitting in groups enjoying the sport. We were desirous of filling up the leisure moments of the Canadians with amusements, not only for the purpose of enlivening their spirits, but also to prevent them from conversing upon our differences with the Indians, which they must have observed. The exercise was also in a peculiar manner serviceable to Mr. Hood. Ever ardent in his pursuits, he had, through close attention to his drawings and other avocations, confined himself too much to the house in winter, and his health was impaired by his sedentary habits. I could only take the part of a spectator in these amusements, being still lame from the hurt formerly alluded to.

The sun now sinks for so short a time below the horizon, that there is more light at midnight, than we enjoyed on some days at noon in the winter-time.

On the 27th the hunters brought in two rein-deer. Many of the

Indians attended divine service this day, and were attentive spectators of our addresses to the throne of the Almighty.

On the 28th I had a conversation with Long-legs, whose arrival two days ago has been mentioned. I acquainted him with the objects of our expedition, and our desire of promoting peace between his nation and the Esquimaux, and learned from him, that his brother the Hook was by this time on the Copper-Mine River with his party; and that, although he had little ammunition, yet it was possible he might have some provision collected before our arrival at his tents. I then decorated him with a medal similar to those given to the other chiefs. He was highly pleased with this mark of our regard, and promised to do every thing for us in his power. Akaitcho came in during the latter part of our conversation, with a very cheerful countenance. Jealousy of the Hook, and a knowledge of the sentiments of the young men being different from his own, with respect to the recent discussions, had combined to produce this change in his conduct, and next morning he took an opportunity of telling me that I must not think the worse of him for his importunities. It was their custom, he said, to do so, however strange it might appear to us, and that he, as the leader of his party, had to beg for them all; but as he saw that we had not deceived him by concealing any of our goods, and that we really had nothing left, he should ask for no more. He then told me that he would set out for the river as soon as the state of the country admitted of their travelling. The snow, he remarked, was still too deep for sledges to the northward, and the moss too wet to make fires. He was seconded in this opinion by Long-legs, whom I was the more inclined to believe, from knowing that he was anxious to rejoin his family as soon as possible.

Akaitcho now accepted the dress he had formerly refused, and next day clothed himself in another new suit, which he had received from us in the autumn. Ever since his arrival at the fort, he had

dressed meanly, and pleaded poverty; but, perceiving that nothing more could be gained by such conduct, he thought proper to shew some of his riches to the strangers who were daily arriving at the fort. In the afternoon, however, he made another, though a covert, attack upon us. He informed me that two old men had just arrived at the encampment with a little pounded meat, which they wished to barter. It was evident that his intention was merely to discover whether we had any goods remaining or not. I told him that we had nothing at present to give for meat, however much we stood in need of it, but that we would pay for it by notes on the North-West Company, in any kind of goods they pleased. After much artful circumlocution, and repeated assurances of the necessities of the men who owned the meat, he introduced them, and they readily agreed to give us the provision on our own terms.

I have deemed it my duty to give the preceding details of the tedious conversations we had with Akaitcho, to point out to future travellers, the art with which these Indians pursue their objects, their avaricious nature, and the little reliance that can be placed upon them when their interests jar with their promises. In these respects they agree with other tribes of northern Indians; but, as has been already mentioned, their dispositions are not cruel, and their hearts are readily moved by the cry of distress.

The average temperature for May was nearly 32°, the greatest heat was 68°, the lowest 8°.

We had constant daylight at the end of the month, and geese and ducks were abundant, indeed rather too much so, for our hunters were apt to waste upon them the ammunition that was given to them for killing deer. Uncertain as to the length of time that our ammunition might be required to last, we did not deem a goose of equal value with the charge it cost to procure it.

Dr. Richardson and Mr. Back having visited the country to the northward of the Slave Rock, and reported that they thought we

might travel over it, I signified my intention of sending the first party off on Monday the 4th of June. I was anxious to get the Indians to move on before, but they lingered about the house, evidently with the intention of picking up such articles as we might deem unnecessary to take. When Akaitcho was made acquainted with my purpose of sending away a party of men, he came to inform me that he would appoint two hunters to accompany them, and at the same time requested that Dr. Richardson, or as he called him, the Medicine Chief, might be sent with his own band. These Indians set a great value upon medicine, and made many demands upon Dr. Richardson on the prospect of his departure. He had to make up little packets, of the different articles in his chest, not only for the leader, but for each of the minor chiefs, who carefully placed them in their medicine bags, noting in their memories the directions he gave for their use. The readiness with which their requests for medical assistance were complied with, was considered by them as a strong mark of our good intentions towards them; and the leader often remarked, that they owed much to our kindness in that respect; that formerly numbers had died every year, but that not a life had been lost since our arrival amongst them. In the present instance, however, the leader's request could not be complied with. Dr. Richardson had volunteered to conduct the first party to the Copper-Mine River, whilst the rest of the officers remained with me to the last moment, to complete our astronomical observations at the house. He, therefore, informed the leader that he would remain stationary at Point Lake until the arrival of the whole party, where he might be easily consulted if any of his people fell sick, as it was in the neighbourhood of their hunting grounds.

On the 2nd the stores were packed up in proper sized bales for the journey. I had intended to send the canoes by the first party, but they were not yet repaired, the weather not being sufficiently warm to permit the men to work constantly at them, without the

The Landscape by Lieut. Back R.N. The Wolf by Lieut. Hood. R.N. Engraved by Edwd. Finden.

THE WHITE WOLF AND A VIEW OF THE DOG RIB ROCK.

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hazard of breaking the bark. This day one of the new trading guns which we had recently received from Fort Chipewyan, burst in the hands of a young Indian; fortunately, however, without doing him any material injury. This is the sixth accident of the kind which has occurred to us since our departure from Slave Lake. Surely this deficiency in the quality of the guns, which hazards the lives of so many poor Indians, requires the serious consideration of the principals of the trading Companies.

On the 4th, at three in the morning, the party under the charge of Dr. Richardson started. It consisted of fifteen voyagers, three of them conducting dog sledges, Baldhead and Basil, two Indian hunters with their wives, Akaiyazzeh a sick Indian and his wife, together with Angelique and Roulante; so that the party consisted of twenty-three exclusive of children.

The burdens of the men were about eighty pounds each, exclusive of their personal baggage which amounted to nearly as much more. Most of them dragged their loads upon sledges, but a few preferred carrying them on their backs. They set off in high spirits.

After breakfast the Indians struck their tents, and the women, the boys, and the old men who had to drag sledges, took their departure. It was three P.M., however, before Akaitcho and the hunters left us. We issued thirty balls to the leader, and twenty to each of the hunters and guides, with a proportionate quantity of powder, and gave them directions to make all the provision they could on their way to Point Lake. I then desired Mr. Wentzel to inform Akaitcho in the presence of the other Indians, that I wished a deposit of provision to be made at this place previous to next September, as a resource should we return this way. He and the guides not only promised to see this done, but suggested that it would be more secure if placed in the cellar, or in Mr. Wentzel's room. The Dog-ribs, they said, would respect any thing that was in the house as knowing it to belong to the white people. At the close of this con-

versation Akaitcho exclaimed with a smile, "I see now that you have really no goods left, (the rooms and stores being completely stripped,) and therefore I shall not trouble you any more, but use my best endeavours to prepare provision for you, and I think if the animals are tolerably numerous, we may get plenty before you can embark on the river."

Whilst the Indians were packing up this morning, one of the women absconded. She belongs to the Dog-rib tribe, and had been taken by force from her relations by her present husband, who has treated her very harshly. The fellow was in my room when his mother announced the departure of his wife, and received the intelligence with great composure as well as the seasonable reproof of Akaitcho. "You are rightly served," said the chief to him, "and will now have to carry all your things yourself, instead of having a wife to drag them." One hunter remained after the departure of the other Indians.

On the 5th the Dog-rib woman presented herself on a hill at some distance from the house, but was afraid to approach us, until the interpreter went and told her that neither we nor the Indian who remained with us, would prevent her from going where she pleased. Upon this she came to solicit a fire-steel and kettle. She was at first low-spirited, from the non-arrival of a countrywoman, who had promised to elope with her, but had probably been too narrowly watched. The Indian hunter, however, having given her some directions as to the most proper mode of joining her own tribe, she became more composed, and ultimately agreed to adopt his advice of proceeding at once to Fort Providence, instead of wandering about the country all summer in search of them, at the imminent hazard of being starved.

On the 7th the wind changing to the southward, dispersed the clouds which had obscured the sky for several days, and produced a change of temperature under which the snow rapidly disappeared. The thermometer rose to 73°, many flies came forth, musquitoes

shewed themselves for the first time, and one swallow made its appearance. We were the more gratified with these indications of summer, that St. Germain was enabled to commence upon the repair of the canoes, and before night had completed the two which had received the least injury. Augustus killed two deer to-day.

On the 10th the dip of the magnetic needle being observed, shewed a decrease of 22′ 44″, since last autumn. The repairs of the third canoe were finished this evening.

The snow was now confined to the bases of the hills, and our Indian hunter told us the season was early. The operations of nature, however, seemed to us, very tardy. We were eager to be gone, and dreaded the lapse of summer, before the Indians would allow it had begun.

On the 11th the geese and ducks had left the vicinity of Fort Enterprise, and proceeded to the northward. Some young ravens and whiskey-johns made their appearance at this time.

On the 12th, Winter River was nearly cleared of ice, and on the 13th the men returned, having left Dr. Richardson on the borders of Point Lake. Dr. Richardson informed me by letter that the snow was deeper in many parts near his encampment than it had been at any time last winter near Fort Enterprise, and that the ice on Point Lake had scarcely begun to decay. Although the voyagers were much fatigued on their arrival, and had eaten nothing for the last twenty-four hours, they were very cheerful, and expressed a desire to start with the remainder of the stores next morning. The Dog-rib woman, who had lingered about the house since the 6th of June, took alarm at the approach of men, thinking, perhaps, that they were accompanied by Indians, and ran off. She was now provided with a hatchet, kettle, and fire steel, and would probably go at once to Fort Providence, in the expectation of meeting with some of her countrymen, before the end of summer.

CHAPTER IX*.

Departure from Fort Enterprise—Navigation of the Copper-Mine River—Visit to the Copper Mountain—Interview with the Esquimaux—Departure of the Indian Hunters—Arrangements made with them for our return.

1821.
June 14. THE trains for the canoes having been finished during the night, the party attached to them commenced their journey at ten this morning. Each canoe was dragged by four men assisted by two dogs. They took the route of Winter Lake, with the intention of following, although more circuitous, the water-course as far as practicable, it being safer for the canoes than travelling over land. After their departure, the remaining stores, the instruments, and our small stock of dried meat, amounting only to eighty pounds, were distributed equally among Hepburn, three Canadians, and the two Esquimaux; with this party and two Indian hunters, we quitted Fort Enterprise, most sincerely rejoicing that the long-wished for day had arrived, when we were to proceed towards the final object of the Expedition.

We left in one of the rooms a box, containing a journal of the occurrences up to this date, the charts, and some drawings, which was to be conveyed to Fort Chipewyan by Mr. Wentzel, on his return from the sea, and from thence to be sent to England. The

* It will be seen hereafter that I had the misfortune to lose my portfolio containing my journals from Fort Enterprise to the 14th of September. But the loss has been amply redeemed by my brother officers' journals, from which the narrative up to that period has been chiefly compiled.

room was blocked up, and, by the advice of Mr. Wentzel, a drawing representing a man holding a dagger in a threatening attitude, was affixed to the door, to deter any Indians from breaking it open. We directed our course towards the Dog-rib Rock, but as our companions were loaded with the weight of near one hundred and eighty pounds weight each, we of necessity proceeded at a slow pace. The day was extremely warm, and the musquitoes, whose attacks had hitherto been feeble, issued forth in swarms from the marshes, and were very tormenting. Having walked five miles we encamped near a small cluster of pines about two miles from the Dog-rib Rock. The canoe party had not been seen since they set out. Our hunters went forward to Marten Lake intending to wait for us at a place where two deer were deposited. At nine P.M. the temperature of the air was 63°.

We resumed our march at an early hour, and crossed several lakes which lay in our course, as the ice enabled the men to drag their burdens on trains formed of sticks and deers' horns, with more ease than they could carry them on their backs. We were kept constantly wet by this operation, as the ice had broken near the shores of the lakes, but this inconvenience was not regarded, as the day was unusually warm: the temperature at two P.M. being $82\frac{1}{2}°$. At Marten Lake we joined the canoe party, and encamped with them. We had the mortification of learning from our hunters that the meat they had put *en cache* here, had been destroyed by the wolverenes, and we had in consequence, to furnish the supper from our scanty stock of dried meat. The wind changed from S.E. to N.E. in the evening, and the weather became very cold, the thermometer being 43° at nine P.M. The few dwarf birches we could collect afforded fire insufficient to keep us warm, and we retired under the covering of our blankets as soon as the supper was despatched. The N.E. breeze rendered the night so extremely cold, that we procured but little sleep, having neither fire nor shelter, for though

we carried our tents we had been forced to leave the tent poles which we could not now replace; we therefore gladly recommenced the journey at five in the morning, and travelled through the remaining part of the lake on the ice. Its surface being quite smooth, the canoes were dragged along expeditiously by the dogs, and the rest of the party had to walk very quick to keep pace with them, which occasioned them to get many heavy falls. By the time we had reached the end of the lake, the wind had increased to a perfect gale, and the atmosphere was so cold that we could not proceed with the canoes further without the risk of breaking the bark and seriously injuring them, we therefore crossed Winter River in them, and put up on a ridge of sand hills in a well sheltered place. But as the stock of provision was scanty, we determined on proceeding as quick as possible, and leaving the canoe party under the charge of Mr. Wentzel. We parted from them in the afternoon and first directed our course towards a range of hills, where we expected to find Antonio Fontano, who had separated from us in the morning. In crossing towards these hills I fell through the ice into the lake, with my bundle on my shoulders, but was soon extricated without receiving any injury; and Mr. Back, who left us to go in search of the straggler, met with a similar accident in the evening. We put up on a ridge of sand hills, where we found some pines, and made a large fire to apprize Mr. Back and Fontano of our situation. St. German having killed a deer in the afternoon, we received an acceptable supply of meat. The night was stormy and very cold.

At five next morning our men were sent in different directions after our absent companions, but as the weather was foggy we despaired of finding them unless they should chance to hear the muskets our people were desired to fire. They returned, however, at ten, bringing intelligence of them. I went immediately with Hepburn to join Mr. Back, and directed Mr. Hood to proceed with the Canadians, and halt with them at a spot where the hunters had

killed a deer. Though Mr. Back was much fatigued he set off with me immediately, and in the evening we rejoined our friends on the borders of the Big Lake. The Indians informed us that Fontano only remained a few hours with them, and then continued his journey. We had to oppose a violent gale and frequent snow storms through the day, which unseasonable weather caused the temperature to descend below the freezing point this evening. The situation of our encampment being bleak, and our fuel stunted green willows, we passed a very cold and uncomfortable night.

June 18.—Though the breeze was moderate this morning, the atmosphere was piercingly keen. When on the point of starting, we perceived Mr. Wentzel's party coming, and awaited his arrival to learn whether the canoes had received any injury during the severe weather of yesterday. Finding they had not, we proceeded to get upon the ice on the lake, which could not be effected without walking up to the waist in water, for some distance from its borders. We had not the command of our feet in this situation, and the men fell often; poor Junius broke through the ice with his heavy burden on his back, but fortunately was not hurt.

This lake is extensive, and large arms branch from its main course in different directions. At these parts we crossed the projecting points of land, and on each occasion had to wade as before, which so wearied every one, that we rejoiced when we reached its north side and encamped, though our resting-place was a bare rock. We had the happiness of finding Fontano at this place. The poor fellow had passed the three preceding days without tasting food, and was exhausted by anxiety and hunger. His sufferings were considered to have been a sufficient punishment for his imprudent conduct in separating from us, and we only admonished him to be more cautious in future.

Having received information that the hunters had killed a deer, we sent three men to fetch the meat, which was distributed between

our party, and the canoe men who had been encamped near to us. The thermometer at three P.M. was 46°, at nine 34°.

We commenced the following day by crossing a lake about four miles in length, and then passed over a succession of rugged hills for nearly the same distance. The men being anxious to reach some pine-trees, which they had seen on their former journey walked a quick pace, though they were suffering from swelled legs and rheumatic pains; we could not, however, attain the desired point, and therefore encamped on the declivity of a hill, which sheltered us from the wind; and used the rein-deer moss for fuel, which afforded us more warmth than we expected. We perceived several patches of snow yet remaining on the surrounding hills. The thermometer varied to-day between 55° and 45°.

On the 20th of June we began our march by crossing a small lake, not without much risk, as the surface of the ice was covered with water to the depth of two feet, and there were many holes into which we slipped, in spite of our efforts to avoid them. A few of the men, being fearful of attempting the traverse with their heavy loads, walked round the eastern end of the lake. The parties met on the sandy ridge, which separates the streams that fall into Winter Lake from those that flow to the northward; and here we killed three deer. Near to the base of this ridge we crossed a small but rapid stream, in which there is a remarkable cascade of about fifty feet descent. Some Indians joined us here, and gave us information respecting the situation of Dr. Richardson's tent, which our hunters considered was sufficient for our guidance, and therefore proceeded as quickly as they could. We marched a few miles farther in the evening, and encamped among some pines; but the comfort of a good fire did not compensate for the torment we suffered from the host of musquitoes we found at this spot. The temperature was 52°.

We set off next morning at a very early hour. The men took the

course of Point Lake, that they might use their sledges, but the officers pursued the nearest route by land to Dr. Richardson's tent, which we reached at eleven A.M. It was situated on the western side of an arm of the lake, and near to the part through which the Copper-Mine River runs. Our men arrived soon after us, and in the evening Mr. Wentzel and his party, with the canoes in excellent condition. They were much jaded by their fatiguing journey, and several were lame from swellings of the lower extremities. The ice on the lake was still six or seven feet thick, and there was no appearance of its decay except near the edges; and as it was evident that, by remaining here until it should be removed, we might lose every prospect of success in our undertaking, I determined on dragging our stores along its surface, until we should come to a part of the river where we could embark; and directions were given this evening for each man to prepare a train for the conveyance of his portion of the stores. I may remark here, as a proof of the strong effect of radiation from the earth in melting the ice, that the largest holes in the ice were always formed at the base of the high and steep cliffs, which abound on the borders of this lake.

We found Akaitcho and the hunters encamped here, but their families, and the rest of the tribe, had gone off two days before to the Beth-see-to, a large lake to the northward, where they intended passing the summer. Long-legs and Keskarrah had departed, to desire the Hook to collect as much meat as he could against our arrival at his lodge. We were extremely distressed to learn from Dr. Richardson, that Akaitcho and his party had expended all the ammunition they had received at Fort Enterprise, without having contributed any supply of provision. The Doctor had, however, through the assistance of two hunters he kept with him, prepared two hundred pounds of dried meat, which was now our sole dependence for the journey. On the following morning I

represented to Akaitcho that we had been greatly disappointed by his conduct, which was so opposite to the promise of exertion he had made, on quitting Fort Enterprise. He offered many excuses, but finding they were not satisfactory, he admitted that the greater part of the ammunition had been given to those who accompanied the women to the Beth-see-to, and promised to behave better in future. I then told him, that I intended in future to give them ammunition only in proportion to the meat which was brought in, and that we should commence upon that plan, by supplying him with fifteen balls, and the hunters with ten each.

The number of our hunters was now reduced to five, as two of the most active declined going any further, their father, who thought himself dying, having solicited them to remain and close his eyes. These five were furnished with ammunition, and sent forward to hunt on the south border of the lake, with directions to place any meat they might procure near to the edge of the lake, and set up marks to guide us to the spots. Akaitcho, his brother, the guide, and three other men, remained to accompany us. We were much surprised to perceive an extraordinary difference in climate in so short an advance to the northward as fifty miles. The snow here was lying in large patches on the hills. The dwarf-birch and willows were only just beginning to open their buds, which had burst forth at Fort Enterprise many days previous to our departure. Vegetation seemed to be three weeks or a month later here than at that place. We had heavy showers of rain through the night of the 22d, which melted the snow, and visibly wasted the ice.

On the 23d, the men were busily employed in making their trains, and in pounding the meat for pemmican. The situation of the encampment was ascertained, latitude 65° 12′ 40″ N., longitude 113° 8′ 25″ W., and the variation 43° 4′ 20″ E. The arrangements being completed, we purposed commencing our journey next morning, but the weather was too stormy to admit of our venturing upon

Drawn by Lieut Back R.N

Engraved by Edwd Finden

EXPEDITION PASSING THROUGH POINT LATA. ON THE ICE.

June 25. 1821.

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the lake with the canoes. In the afternoon a heavy fall of snow took place, which was succeeded by sleet and rain. The north-east gale continued, but the thermometer rose to 39°.

June 25.—The wind having abated in the night, we prepared for starting at an early hour. The three canoes were mounted on sledges, and nine men were appointed to conduct them, having the assistance of two dogs to each canoe. The stores and provisions were distributed equally among the rest of our men, except a few small articles which the Indians carried. The provision consisted of only two bags of pemmican, two of pounded meat, five of suet, and two small bundles of dried provision, together with fresh meat sufficient for our supper at night. It was gratifying to witness the readiness with which the men prepared for and commenced the journey, which promised to be so very laborious, as each of them had to drag upwards of one hundred and eighty pounds on his sledge. Mr. Back having chosen the moment of our setting off for sketching the annexed accurate and interesting picture of our mode of travelling on the ice, further description of it is unnecessary.

Our course led down the main channel of the lake, which varied in breadth from half a mile to three miles; but we proceeded at a slow pace, as the snow which fell last night, and still lay on the lake, very much impeded the sledges. Many extensive arms branched off on the north side of this channel, and it was bounded on the south by a chain of lofty islands. The hills on both sides rose to the height of six hundred or seven hundred feet, and high steep cliffs were numerous. Clusters of pines were occasionally seen in the valleys. We put up, at eight P.M., in a spot which afforded us but a few twigs for fuel. The party was much fatigued, and several of the men were affected by an inflammation on the inside of the thigh, attended with hardness and swelling. The distance made to-day was six miles.

We started at ten next morning. The day was extremely hot, and the men were soon jaded; their lameness increased very much, and some not previously affected began to complain. The dogs too shewed symptoms of great weakness, and one of them stretched himself obstinately on the ice, and was obliged to be released from the harness. Under these circumstances we were compelled to encamp at an early hour, having come only four miles. The sufferings of the people in this early stage of our journey were truly discouraging to them, and very distressing to us, whose situation was comparatively easy. I, therefore, determined on leaving the third canoe, which had been principally carried to provide against any accident happening to the others. By this we gained three men, to lighten the loads of those who were most lame, and an additional dog for each of the other canoes. It was accordingly properly secured on a stage erected for the purpose near the encampment. Dried meat was issued for supper, but in the course of the evening the Indians killed two deer, which were immediately sent for.

The channel of the lake through which we had passed to-day was bounded on both sides by islands of considerable height, presenting bold and rugged scenery. We were informed by our guide, that a large body of the lake lies to the northward of a long island which we passed.

Another deer was killed next morning, but as the men breakfasted off it before they started, the additional weight was not materially felt. The burthens of the men being considerably lightened by the arrangements of last evening, the party walked at the rate of one mile and three quarters an hour until the afternoon, when our pace was slackened, as the surface of the ice was more rough, and our lame companions felt their sores very galling. At noon we passed a deep bay on the south side, which is said to

receive a river. Throughout the day's march the hills on each side of the lake bore a strong resemblance, in height and form, to those about Fort Enterprise. We encamped on the north main shore, among some spruce trees, having walked eight miles and a half. Three or four fish were caught with lines through holes, which the water had worn in the ice. We perceived a slight westerly current at these places.

It rained heavily during the night, and this was succeeded by a dense fog on the morning of the 28th. Being short of provisions we commenced our journey, though the points of land were not discernible beyond a short distance. The surface of the ice, being honeycombed by the recent rains, presented innumerable sharp points, which tore our shoes, and lacerated the feet at every step. The poor dogs, too, marked their path with their blood.

In the evening the atmosphere became clear, and, at five P.M., we reached the rapid by which Point Lake communicates with Red-Rock Lake. This rapid is only one hundred yards wide, and we were much disappointed at finding the Copper-Mine River such an inconsiderable stream. The canoes descended the rapid, but the cargoes were carried across the peninsula, and placed again on the sledges, as the next lake was still frozen. We passed an extensive arm, branching to the eastward, and encamped just below it, on the western bank, among spruce pines, having walked six miles of direct distance. The rolled stones on the beach are principally red clay slate, hence its Indian appellation, which we have retained.

We continued our journey at the usual hour next morning. At noon the variation was observed to be 47° east. Our attention was afterwards directed to some pine branches, scattered on the ice, which proved to be marks placed by our hunters, to guide us to the spot where they had deposited the carcasses of two small deer. This supply was very seasonable, and the men cheerfully dragged the additional weight. Akaitcho, judging from the appearance of

the meat, thought it had been placed here three days ago, and that the hunters were considerably in advance. We put up, at six P.M., near the end of the lake, having come twelve miles and three quarters, and found the channel open by which it is connected with the Rock-nest Lake. A river was pointed out, bearing south from our encampment, which is said to rise near Great Marten Lake. Red-rock Lake is in general narrow, its shelving banks are well clothed with wood, and even the hills, which attain an elevation of four hundred or five hundred feet, are ornamented, half way up, with stunted pines.

On June 30, the men having gummed the canoes, embarked with their burdens to descend the river; but we accompanied the Indians about five miles across a neck of land, when we also embarked. The river was about two hundred yards wide, and its course being uninterrupted, we cherished a sanguine hope of now getting on more speedily, until we perceived that the waters of Rock-nest Lake were still bound by ice, and that recourse must again be had to the sledges. The ice was much decayed, and we were exposed to great risk of breaking through in making the traverse. In one part we had to cross an open channel in the canoes, and in another were compelled to quit the lake, and make a portage along the land. When the party had got upon the ice again, our guide evinced much uncertainty as to the route. He first directed us towards the west end of the lake; but when we had nearly gained that point, he discovered a remarkable rock to the north-east, named by the Indians the Rock-nest, and then recollected that the river ran at its base. Our course was immediately changed to that direction, but the traverse we had then to make was more dangerous than the former one. The ice cracked under us at every step, and the party were obliged to separate themselves widely to prevent accidents. We landed at the first point we could approach, but having found an open channel close to the shore, we were obliged to ferry the goods across on pieces of ice.

The fresh meat being expended we had to make another inroad on our pounded meat. The evening was very warm, and the musquitoes numerous. A large fire was made to apprize the hunters of our advance. The scenery of Rock-nest Lake is picturesque, its shores are rather low, except at the Rock's-nest, and two or three eminences on the eastern side. The only wood is the pine, which is twenty or thirty feet high, and about one foot in diameter. Our distance to-day was six miles.

July 1.—Our guide directed us to proceed towards a deep bay on the north side of the lake, where he supposed we should find the river. In consequence of the bad state of the ice, we employed all the different modes of travelling we had previously followed in attaining this place; and, in crossing a point of land, had the misfortune to lose one of the dogs, which set off in pursuit of some rein-deer. Arriving at the bay, we only found a stream that fell into it from the north-east, and looked in vain for the Copper-Mine River. This circumstance confused the guide, and he confessed that he was now doubtful of the proper route; we, therefore, halted, and despatched him, with two men, to look for the river from the top of the high hills near the Nest-rock. During this delay a slight injury was repaired, which one of the canoes had received. We were here amused by the interesting spectacle of a wolf chasing two rein-deer on the ice. The pursuer being alarmed at the sight of our men, gave up the chase when near to the hindmost, much to our regret, for we were calculating upon the chance of sharing in his capture.

At four P.M. our men returned, with the agreeable information that they had seen the river flowing at the base of the Rock-nest. The canoes and stores were immediately placed on the ice, and dragged thither; we then embarked, but soon had to cut through a barrier of drift ice that blocked up the way. We afterwards descended two strong rapids, and encamped near to the discharge of a

small stream which flows from an adjoining lake. The Copper-Mine River, at this point, is about two hundred yards wide, and ten feet deep, and flows very rapidly over a rocky bottom. The scenery of its banks is picturesque, the hills shelve to the water-side, and are well covered with wood, and the surface of the rocks is richly ornamented with lichens. The Indians say that the same kind of country prevails as far as Mackenzie's River in this parallel; but that the land to the eastward is perfectly barren. Akaitcho and one of the Indians killed two deer, which were immediately sent for. Two of the hunters arrived in the night, and we learned that their companions, instead of being in advance, as we supposed, were staying at the place where we first found the river open. They had only seen our fires last evening, and had sent to examine who we were. The circumstance of having passed them was very vexatious, as they had three deer *en cache* at their encampment. However, an Indian was sent to desire those who remained to join us, and bring the meat.

We embarked at nine A.M. on July 2nd, and descended a succession of strong rapids for three miles. We were carried along with extraordinary rapidity, shooting over large stones, upon which a single stroke would have been destructive to the canoes; and we were also in danger of breaking them, from the want of the long poles which lie along their bottoms and equalize their cargoes, as they plunged very much, and on one occasion the first canoe was almost filled with the waves. But there was no receding after we had once launched into the stream, and our safety depended on the skill and dexterity of the bowmen and steersmen. The banks of the river here are rocky, and the scenery beautiful; consisting of gentle elevations and dales wooded to the edge of the stream, and flanked on both sides at the distance of three or four miles by a range of round-backed barren hills, upwards of six hundred feet high. At the foot of the rapids the high lands receded to a greater distance,

and the river flowed with a more gentle current, in a wider channel, through a level and open country consisting of alluvial sand. In one place the passage was blocked up by drift ice, still covered to some depth with snow. A channel for the canoes was made for some way with the hatchets and poles; but on reaching the more compact part we were under the necessity of transporting the canoes and cargoes across it; an operation of much hazard, as the snow concealed the numerous holes which the water had made in the ice. This expansion of the river being mistaken by the guide for a lake, which he spoke of as the last on our route to the sea, we supposed that we should have no more ice to cross, and therefore encamped after passing through it, for the purpose of fitting the canoes properly for the voyage, and to provide poles, which are not only necessary to strengthen them when placed in the bottom, but essentially requisite for the safe management of them in dangerous rapids. The guide began afterwards to doubt whether the lake he meant was not further on, and he was sent with two men to examine into the fact, who returned in the evening with the information of its being below us, but that there was an open channel through it. This day was very sultry, several plants appeared in flower.

The men were employed in repairing their canoes to a late hour, and commenced very early next morning, as we were desirous of availing ourselves of every part of this favourable weather for their operations. The hunters arrived in the course of the night. It appeared that the dog which escaped from us two days ago came into the vicinity of their encampment, howling piteously; seeing him without his harness, they came to the hasty conclusion that our whole party had perished in a rapid; and throwing away part of their baggage, and leaving the meat behind them, they set off with the utmost haste to join Long-legs. Our messenger met them in their flight, but too far advanced to admit of their returning for the meat. Akaitcho scolded them heartily for their thoughtlessness in

leaving the meat, which we so much wanted. They expressed their regret, and being ashamed of their panic, proposed to remedy the evil as much as possible by going forward, without stopping until they came to a favourable spot for hunting, which they expected to do about thirty or forty miles below our present encampment. Akaitcho accompanied them, but previous to setting off he renewed his charge that we should be on our guard against the bears, which was occasioned by the hunters having fired at one this morning as they were descending a rapid in their canoe. As their small canoes would only carry five persons, two of the hunters had to walk in turns along the banks.

In our rambles round the encampment, we witnessed with pleasure the progress which the vegetation had made within the few last warm days; most of the trees had put forth their leaves, and several flowers ornamented the moss-covered ground; many of the smaller summer birds were observed in the woods, and a variety of ducks, gulls, and plovers, were seen on the banks of the river. The river is about three hundred yards wide at this part, is deep and flows over a bed of alluvial sand. We caught some trout of considerable size with our lines, and a few white fish in the nets, which maintained us, with a little assistance from the pemmican. The repair of our canoes was completed this evening. Previous to embarking I issued an order that no rapid should in future be descended until the bowmen had examined it, and decided upon its being safe to run. Wherever the least danger was to be apprehended, or the crew had to disembark for the purpose of lightening the canoe, the ammunition, guns and instruments, were always to be put out and carried along the bank; that we might be provided with the means of subsisting ourselves, in case of any accident befalling the canoes.

The situation of our encampment was ascertained to be 65° 43′ 28″ N., longitude 114° 26′ 45″ W., and the variation 42° 17′ 22″ E.

At four in the morning of July 4th we embarked and descended a succession of very agitated rapids, but took the precaution of landing the articles mentioned yesterday, wherever there appeared any hazard; notwithstanding all our precautions the leading canoe struck with great force against a stone, and the bark was split, but this injury was easily repaired, and we regretted only the loss of time. At eleven we came to an expansion of the river where the current ran with less force, and an accumulation of drift ice had, in consequence, barred the channel; which the canoes and cargoes were carried over. The ice in many places adhered to the banks, and projected in wide ledges several feet thick over the stream, which had hollowed them out beneath. On one occasion as the people were embarking from one of these ledges, it suddenly gave way, and three men were precipitated into the water, but were rescued without further damage than a sound ducking, and the canoe fortunately, (and narrowly) escaped being crushed. Perceiving one of the Indians sitting on the east bank of the river, we landed, and having learned from him that Akaitcho and the hunters had gone in pursuit of a herd of musk oxen, we encamped, having come twenty-four miles and a half.

In the afternoon they brought us the agreeable intelligence of their having killed eight cows, of which four were full grown. All the party were immediately despatched to bring in this seasonable supply. A young cow irritated by the firing of the hunters ran down to the river, and passed close to me when walking at a short distance from the tents. I fired and wounded it, when the animal instantly turned, and ran at me, but I avoided its fury by jumping aside and getting upon an elevated piece of ground. In the mean time some people came from the tents, and it took to flight.

The musk oxen, like the buffalo, herd together in bands, and

generally frequent the barren grounds during the summer months, keeping near to the banks of the rivers, but retire to the woods in winter. They seem to be less watchful than most other wild animals, and when grazing are not difficult to approach, provided the hunters go against the wind; when two or three men get so near a herd as to fire at them from different points, these animals instead of separating or running away, huddle closer together, and several are generally killed; but if the wound is not mortal they become enraged and dart in the most furious manner at the hunters, who must be very dexterous to evade them. They can defend themselves by their powerful horns against the wolves and bears, which as the Indians say, they not unfrequently kill.

The musk oxen feed on the same substances with the rein-deer, and the prints of the feet of these two animals are so much alike that it requires the eye of an experienced hunter to distinguish them. The largest of these animals killed by us did not exceed in weight three hundred pounds. The flesh has a musky disagreeable flavour, particularly when the animal is lean, which unfortunately for us was the case with all that were now killed by us.

During this day's march the river varied in breadth from one hundred to two hundred feet, and except in two open spaces, a very strong current marked a deep descent the whole way. It flows over a bed of gravel, of which also its immediate banks are composed. Near to our encampment it is bounded by cliffs of fine sand from one hundred to two hundred feet high. Sandy plains extend on a level with the summit of these cliffs, and at the distance of six or seven miles are terminated by ranges of hills eight hundred or one thousand feet high. The grass on these plains affords excellent pasturage for the musk oxen, and they generally abound here. The hunters added two more to our stock in the course of the night. As we had now more meat than the party could consume fresh,

we delayed our voyage next day for the purpose of drying it. The hunters were supplied with more ammunition, and sent forward; but Akaitcho, his brother, and another Indian remained with us.

It may here be proper to mention, that the officers had treated Akaitcho more distantly since our departure from Point Lake, for the purpose of shewing him their opinion of his misconduct. The diligence in hunting, however, which he had evinced at this place, induced us to receive him more familiarly when he came to the tent this evening. During our conversation he endeavoured to excite suspicions in our minds against the Hook, by saying, "I am aware that you consider me the worst man of my nation; but I know the Hook to be a great rogue, and, I think, he will disappoint you."

On the morning of the 6th we embarked, and descended a series of rapids, having twice unloaded the canoes where the water was shallow. After passing the mouth of the Fairy * Lake River the rapids ceased. The main stream was then about three hundred yards wide, and generally deep, though, in one part, the channel was interrupted by several sandy banks, and low alluvial islands covered with willows. It flows between banks of sand thinly wooded, and as we advanced the barren hills approached the water's edge.

At ten we rejoined our hunters, who had killed a deer, and halted to breakfast. We sent them forward; one of them, who

* This is an Indian name. The Northern Indian fairies are six inches high, lead a life similar to the Indians, and are excellent hunters. Those who have had the good fortune to fall in with their tiny encampments have been kindly treated, and regaled on venison. We did not learn with certainty whether the existence of these delightful creatures is known from Indian tradition, or whether the Indians owe their knowledge of them to their intercourse with the traders, but think the former probable.

was walking along the shore afterwards, fired upon two brown bears, and wounded one of them, which instantly turned and pursued him. His companions in the canoes put ashore to his assistance, but did not succeed in killing the bears, which fled upon the reinforcement coming up. During the delay thus occasioned we overtook them, and they continued with us during the rest of the day.

We encamped at the foot of a lofty range of mountains, which appear to be from one thousand two hundred to one thousand five hundred feet high; they are in general round backed, but the outline is not even, being interrupted by craggy conical eminences. This is the first ridge of hills we have seen in this country, that deserves the appellation of a mountain range; it is probably a continuation of the stony mountains crossed by Hearne. Many plants appeared in full flower near the tents, and Dr. Richardson gathered some high up on the hills. The distance we made to-day was fifty miles.

There was a hoar frost in the night, and the temperature, at four next morning, was 40°: embarking at that hour, we glided quickly down the stream and, by seven arrived at the Hook's encampment, which was placed on the summit of a lofty sand cliff, whose base was washed by the river. This chief had with him only three hunters, and a few old men and their families, the rest of his band having remained at their snares in Bear Lake. His brother, Long-legs, and our guide, Keskarrah, who had joined him three days before, had communicated to him our want of provision, and we were happy to find that, departing from the general practice of Indian chiefs, he entered at once upon the business, without making a long speech. As an introductory mark of our regard, I decorated him with a medal, similar to those which had been given to the other leaders. The Hook began by stating, " that he was aware of our being destitute of provision, and of the great need we had of

an ample stock, to enable us to execute our undertaking; and his regret, that the unusual scarcity of animals this season, together with the circumstance of his having only just received a supply of ammunition from Fort Providence, had prevented him from collecting the quantity of meat he had wished to do for our use. The amount, indeed," he said, "is very small, but I will cheerfully give you what I have: we are too much indebted to the white people, to allow them to want food on our lands, whilst we have any to give them. Our families can live on fish until we can procure more meat, but the season is too short to allow of your delaying, to gain subsistence in that manner." He immediately desired, aloud, that the women should bring all the meat they had to us; and we soon collected sufficient to make three bags and a half of pemmican, besides some dried meat and tongues. We were truly delighted by this prompt and cheerful behaviour, and would gladly have rewarded the kindness of himself and his companions by some substantial present, but we were limited by the scantiness of our store to a small donation of fifteen charges of ammunition to each of the chiefs. In return for the provision they accepted notes on the North-West Company, to be paid at Fort Providence; and to these was subjoined an order for a few articles of clothing, as an additional present. I then endeavoured to prevail upon the Hook to remain in this vicinity with his hunters until the autumn, and to make deposits of provision in different parts of the course to the sea, as a resource for our party, in the event of our being compelled to return by this route. He required time, however, to consider this matter, and promised to give me an answer next day. I was rejoiced to find him then prepared to meet my wish, and the following plan was agreed upon:—As the animals abound, at all times, on the borders of Bear Lake, they promised to remain on the east side of it until the month of November, at that spot which is nearest

to the Copper-Mine River, from whence there is a communication by a chain of lakes and portages. There the principal deposit of provision was to be made; but during the summer the hunters were to be employed in putting up supplies of dried meat at convenient distances, not only along the communication from this river, but also upon its banks, as far down as the Copper Mountain. They were also to place particular marks to guide our course to their lodges. We contracted to repay them liberally, whether we returned by this way or not; if we did, they were to accompany us to Fort Providence to receive the reward; and, at any rate, I promised to send the necessary documents by Mr. Wentzel, from the sea-coast, to ensure their having an ample remuneration. With this arrangement they were perfectly satisfied, and we could not be less so, knowing they had every motive for fulfilling their promises, as the place they had chosen to remain at is their usual hunting-ground. The uncommon anxiety these chiefs expressed for our safety, appeared to us as likely to prompt them to every care and attention, and I record their expressions with gratitude. After representing the numerous hardships we should have to encounter in the strongest manner, though in language similar to what we had often heard from our friend Akaitcho, they earnestly entreated we would be constantly on our guard against the treachery of the Esquimaux; and no less forcibly desired we would not proceed far along the coast, as they dreaded the consequences of our being exposed to a tempestuous sea in canoes, and having to endure the cold of the autumn on a shore destitute of fuel. The Hook, having been an invalid for several years, rejoiced at the opportunity of consulting Dr. Richardson, who immediately gave him advice, and supplied him with medicine.

The pounded meat and fat were converted into pemmican, preparatory to our voyage.

The result of our observations at the Hook's encampment was, latitude 66° 45′ 11″ N., longitude 115° 42′ 23″ W., variation of the compass 46° 7′ 30″ E.

We embarked at eleven to proceed on our journey. Akaitcho and his brother, the guide, being in the first canoe, and old Keskarrah in the other. We wished to dispense with the further attendance of two guides, and made a proposition that either of them might remain here, but neither would relinquish the honour of escorting the Expedition to the sea. One of our hunters, however, was less eager for this honour, and preferred remaining with Keskarrah's fascinating daughter. The other four, with the Little Singer, accompanied us, two of them conducting their small canoes in turns, and the rest walking along the beach.

The river flows over a bed of sand, and winds in an uninterrupted channel of from three quarters to a mile broad, between two ranges of hills, which are pretty even in their outline, and round backed, but having rather steep acclivities. The immediate borders of the stream consisted either of high banks of sand, or steep gravel cliffs; and, sometimes, where the hills receded to a little distance, the intervening space was occupied by high sandy ridges.

At three P.M., after passing along the foot of a high range of hills, we arrived at the portage leading to the Bear Lake, to which we have previously alluded. Its position is very remarkable, being situated at the most westerly part of the Copper-Mine River, and at the point where it resumes a northern course, and forces a passage through the lofty ridge of mountains, to which it had run parallel for the last thirty miles. As the Indians travel from hence, with their families, in three days, to the point where they propose staying for us, the distance, I think, cannot exceed forty miles; and, admitting the course to be due west, which is the direction the

guide pointed, that distance would place the eastern part of Bear Lake in 118¼° W. longitude.

Beyond this spot the river is diminished in breadth, and a succession of rapids are formed; but as the water was deep, we passed through them without discharging any part of the cargoes. It still runs between high ranges of mountains, though its actual boundaries are banks of mud mixed with clay, which are clothed with stunted pines. We picked up a deer which the hunters had shot, and killed another from the canoe; and also received an addition to our stock of provision of seven young geese, which the hunters had beaten down with their sticks. About six P.M. we perceived a mark on the shore, which, on examination, was found to have been recently put up by some Indians; and, on proceeding further, we discerned stronger proofs of their being near to that spot; we, therefore, encamped, and made a large fire as a signal, which they answered in a similar way. Mr. Wentzel was immediately sent, in expectation of getting provision from them. On his return, we learned that the party consisted of three old Copper Indians, with their families, who had supported themselves with the bow and arrow since last autumn, not having visited Fort Providence for more than a year; and so successful had they been, that they were enabled to supply us with upwards of seventy pounds of dried meat, and six moose skins fit for making shoes, which were the more valuable, as we were apprehensive of being barefooted before the journey could be completed. The evening was sultry, and the musquitoes appeared in great numbers. The distance made to-day twenty-five miles.

On the following morning we went down to these Indians, and delivered to them notes on the North-West Company, for the meat and skins they had furnished; and we had then the mortification of learning, that not having people to carry a considerable quantity

of pounded meat, which they had intended for us, they had left it upon the Bear-Lake Portage. They promised, however, to get it conveyed to the banks of this river before we could return, and we rewarded them with a present of knives and files.

After re-embarking we continued to descend the river, which was now contracted between lofty banks to about one hundred and twenty yards wide; the current was very strong. At eleven we came to a rapid, which had been the theme of discourse with the Indians for many days, and which they had described to us as impassable in canoes. The river here descends. for three quarters of a mile, in a deep, but narrow and crooked, channel, which it has cut through the foot of a hill of five hundred or six hundred feet high. It is confined between perpendicular cliffs resembling stone walls, varying in height from eighty to one hundred and fifty feet, on which lies a mass of fine sand. The body of the river, pent within this narrow chasm, dashed furiously round the projecting rocky columns, and discharged itself at the northern extremity in a sheet of foam. The canoes, after discharging part of their cargoes, ran through this defile without sustaining any injury. Accurate sketches of this interesting scene were taken by Messrs. Back and Hood. Soon after passing this rapid, we perceived the hunters running up the east side of the river, to prevent us from disturbing a herd of musk oxen, which they had observed grazing on the opposite bank; we put them across, and they succeeded in killing six, upon which we encamped for the purpose of drying the meat. The country below the rocky defile rapid consists of sandy plains, broken by small conical eminences also of sand; and bounded to the westward by a continuation of the mountain chain, which we had crossed at the Bear-Lake Portage; and to the eastward and northward, at the distance of twelve miles, by the Copper Mountains which Mr. Hearne visited. The plains are crowned by several clumps of moderately large spruces, about thirty feet high.

This evening the Indians made a large fire, as a signal to the Hook's party that we had passed the *terrific* rapid in safety.

The position of our encampment was ascertained to be, latitude 67° 1′ 10″ N., longitude 116° 27′ 28″ W., variation of the compass 44° 11′ 43″ E., dip of the needle 87° 31′ 18″.

Some thunder showers retarded the drying of the meat, and our embarkation was delayed next day. The hunters were sent forward to hunt at the Copper Mountains, under the superintendence of Adam, the interpreter, who received strict injunctions not to permit them to make any large fires, lest they should alarm straggling parties of the Esquimaux.

The musquitoes were now very numerous and annoying, but we consoled ourselves with the hope that their season would be short.

On the 11th we started at three A.M., and as the guide had represented the river below our encampment to be full of shoals, some of the men were directed to walk along the shore, but they were assailed so violently by the musquitoes, as to be compelled to embark very soon; and we afterwards passed over the shallow parts by the aid of the poles, without experiencing much interruption. The current ran very rapidly, having been augmented by the waters of the Mouse River and several small streams. We rejoined our hunters at the foot of the Copper Mountains, and found they had killed three musk oxen. This circumstance determined us on encamping to dry the meat, as there was wood at the spot. We availed ourselves of this delay to visit the Copper Mountains in search of specimens of the ore, agreeably to my instructions; and a party of twenty-one persons, consisting of the officers, some of the voyagers, and all the Indians, set off on that excursion. We travelled for nine hours over a considerable space of ground, but found only a few small pieces of native copper. The range we ascended was on the west side of the river, extending W.N.W. and E.S.E. The mountains

varied in height from one thousand two hundred to one thousand five hundred feet. For a description of the character of the rocks I must refer the reader to Dr. Richardson's Mineralogical Observations. The uniformity of the mountains is interrupted by narrow valleys traversed by small streams. The best specimens of metal we procured were found among the stones in these valleys, and it was in such situations that our guides desired us to search most carefully. It would appear, that when the Indians see any sparry substance projecting above the surface, they dig there; but they have no other rule to direct them, and have never found the metal in its original repository. Our guides reported that they had found copper in large pieces in every part of this range, for two days' walk to the north-west, and that the Esquimaux come hither to search for it. The annual visits which the Copper Indians were accustomed to make to these mountains, when most of their weapons and utensils were made of copper, have been discontinued since they have been enabled to obtain a supply of ice chisels and other instruments of iron by the establishment of trading posts near to their hunting grounds. That none of those who accompanied us had visited them for many years was evident, from their ignorance of the spots most abundant in metal.

The impracticability of navigating the river upwards from the sea, and the want of wood for forming an establishment, would prove insuperable objections to rendering the collection of copper at this part worthy of mercantile speculation.

We had the opportunity of surveying the country from several elevated positions. Two or three small lakes only were visible, still partly frozen; and much snow remained on the mountains The trees were reduced to a scanty fringe on the borders of the river, and every side was beset by naked mountains.

The day was unusually warm, and, therefore, favourable for drying

the meat. Our whole stock of provision, calculated for preservation, was sufficient for fourteen days, without any diminution of the ordinary allowance of three pounds to each man per day. The situation of our tents was 67° 10′ 30″ N., longitude 116° 25′ 45″ W.

June 12.—The Indians, knowing the course of the river below this point to be only a succession of rapids, declined taking their canoes any further; but as I conceived one of them would be required, should we be compelled to walk along the coast, two of our men were appointed to conduct it.

As we were now entering on the confines of the Esquimaux country, our guides recommended us to be cautious in lighting fires, lest we should discover ourselves, adding that the same reason would lead them to travel as much as possible in the valleys, and to avoid crossing the tops of the hills. We embarked at six A.M., taking with us only old Keskarrah. The other Indians walked along the banks of the river. Throughout this day's voyage the current was very strong, running four or five miles an hour; but the navigation was tolerable, and we had to lighten the canoes only once, in a contracted part of the river where the waves were very high. The river is in many places confined between perpendicular walls of rock to one hundred and fifty yards in width, and there the rapids were most agitated. Large masses of ice twelve or fourteen feet thick, were still adhering to many parts of the bank, indicating the tardy departure of winter from this inhospitable land, but the earth around them was rich with vegetation. In the evening two musk-oxen being seen on the beach, were pursued and killed by our men. Whilst we were waiting to embark the meat, the Indians rejoined us, and reported they had been attacked by a bear, which sprang upon them whilst they were conversing together. His attack was so sudden that they had not time to level their guns properly, and they all missed except Akaitcho, who, less confused than the rest, took

deliberate aim, and shot the animal dead. They do not eat the flesh of the bear, but knowing that we had no such prejudice, they brought us some of the choice pieces, which upon trial we found to be excellent meat.

The Indians having informed us that we were now within twelve miles of the rapid where the Esquimaux have invariably been found, we pitched our tents on the beach, under the shelter of a high hill whose precipitous side is washed by the river, intending to send forward some persons to determine the situation of their present abode. Some vestiges of an old Esquimaux encampment were observed near to the tents, and the stumps of the trees bore marks of the stone hatchets they use. A strict watch was appointed, consisting of an officer, four Canadians, and an Indian, and directions were given for the rest of the party to sleep with their arms by their side. That as little delay as possible might be experienced in opening a communication with the Esquimaux, we immediately commenced the arrangements for sending forward persons to discover whether there were any in our vicinity. Akaitcho and the guides proposed that two of the hunters should be despatched on this service, who had extremely quick sight, and were accustomed to act as scouts, an office which required equal caution and circumspection. A strong objection, however, lay against this plan in the probability of their being discovered by a straggling hunter, which would be destructive to every hope of accommodation. It was therefore determined to send Augustus and Junius, who were very desirous to undertake the service. These adventurous men proposed to go armed only with pistols concealed in their dress, and furnished with beads, looking-glasses and other articles, that they might conciliate their countrymen by presents. We could not divest our minds of the apprehension, that it might be a service of much hazard if the Esquimaux were as hostile to strangers as the Copper Indians have invariably represented them to be; and we felt great reluctance in

exposing our two little interpreters, who had rendered themselves dear to the whole party, to the most distant chance of receiving injury; but this course of proceeding appeared in their opinion and our own to offer the only chance of gaining an interview. Though not insensible to the danger, they cheerfully prepared for their mission, and clothed themselves in Esquimaux dresses, which had been made for the purpose at Fort Enterprise. Augustus was desired to make his presents, and to tell the Esquimaux that the white men had come to make peace between them and all their enemies, and also to discover a passage by which every article of which they stood in need might be brought in large ships. He was not to mention that we were accompanied by the Indians, but to endeavour to prevail on some of the Esquimaux to return with him. He was directed to come back immediately if there were no lodges at the rapid.

The Indians were not suffered to move out of our sight, but in the evening we permitted two of them to cross the river in pursuit of a musk-ox, which they killed on the beach, and returned immediately. The officers prompted by an anxious solicitude for Augustus and Junius, crawled up frequently to the summit of the mountain, to watch their return. The view, however, was not extensive, being bounded at the distance of eight miles by a range of hills similar to the Copper Mountains, but not so lofty. The night came without bringing any intelligence of our messengers, and our fears for their safety increased with the length of their absence.

As every one had been interested in the welfare of these men through their vivacity and good-nature, and for the assistance they had cheerfully rendered in bearing their portion of whatever labour might be going on, their detention formed the subject of all our conversation, and numerous conjectures were hazarded as to the cause.

Dr. Richardson having the first watch, had gone to the summit of the hill, and remained seated contemplating the river that washed

the precipice under his feet, long after dusk had hid distant objects from his view. His thoughts were, perhaps, far distant from the surrounding objects, when he was roused by an indistinct noise behind him, and on looking round, perceived that nine white wolves had ranged themselves in form of a crescent, and were advancing, apparently with the intention of driving him into the river. On his rising up they halted, and when he advanced they made way for his passage down to the tents. He had his gun in his hand but forebore to fire, lest there should be Esquimaux in the neighbourhood. During Mr. Wentzel's middle watch the wolves appeared repeatedly on the summit of the hill, and at one time they succeeded in driving a deer over the precipice. The animal was stunned by the fall, but recovering itself, swam across the stream, and escaped up the river. I may remark here that at midnight it was tolerably dark in the valley of the river at this time, but that an object on the eminence above could be distinctly seen against the sky.

The following observations were taken at this encampment, latitude 67° 23′ 14″ N., longitude 116° 6′ 51″ W., variation 49° 46′ 24″ E. Thermometer 75° at three P.M. Sultry weather.

Augustus and Junius not having returned next morning, we were more alarmed respecting them, and determined on proceeding to find out the cause of their detention, but it was eleven A.M. before we could prevail upon the Indians to remain behind, which we wished them to do, fearing that the Esquimaux might suspect our intentions, if they were seen in our suite. We promised to send for them when we had paved the way for their reception, but Akaitcho ever ready to augur misfortune, expressed his belief that our messengers had been killed, and that the Esquimaux, warned of our approach, were lying in wait for us, and "although," said he, "your party may be sufficiently strong to repulse any hostile attack, my band is too weak when separated from you to offer an effectual resistance; and therefore we are determined to go on with you, or to

return to our lands." After much argument, however, he yielded to our request, and agreed to stay behind provided Mr. Wentzel would remain with him. This gentleman was accordingly left with a Canadian attendant, and they promised not to pass a range of hills then in view to the northward, unless we sent notice to them.

The river during the whole of this day's voyage flowed between alternate cliffs of loose sand intermixed with gravel, and red sand stone rocks, and was everywhere shallow and rapid. As its course was very crooked, much time was spent in examining the different rapids previous to running them, but the canoes descended them, except at a single place, without any difficulty. Most of the officers and half the men marched along the land to lighten the canoes, and reconnoitre the country, each person being armed with a gun and a dagger. Arriving at a range of mountains which had terminated our view yesterday, we ascended it with much eagerness, expecting to see the rapid that Mr. Hearne visited near to its base, and to gain a view of the sea; but our disappointment was proportionably great, when we beheld beyond a plain similar to that we had just left, terminated by another range of trap hills, between whose tops the summits of some distant blue mountains appeared. Our reliance on the information of the guides, which had been for some time shaken, was now quite at an end, and we feared that the sea was still far distant. The flat country here is covered with grass, and is devoid of the large stones, so frequent in the barren grounds, but the ranges of trap hills which seem to intersect it at regular distances are quite barren. A few decayed stunted pines were standing on the borders of the river. In the evening we had the gratification of meeting Junius, who was hastening back to inform us that they had found four Esquimaux tents at the fall which we recognised to be the one described by Mr. Hearne. The inmates were asleep at the time of their arrival, but rose soon afterwards,

and then Augustus presented himself, and had some conversation across the river. He told them the white people had arrived, who would make them very useful presents. The information of our arrival, seemed to alarm them very much, but as the noise of the rapid prevented them from hearing distinctly, one of them came nearer to him in his canoe, and received the rest of the message. He would not, however, land on his side of the river, but returned to their tents without receiving the present. His language differed in some respects from Augustus's, but they understood each other tolerably well. Augustus trusting for a supply of provision to the Esquimaux, had neglected to carry any with him, and this was the main cause of Junius's return. We now encamped, having come fourteen miles. After a few hours' rest Junius set off again to rejoin his companion, being accompanied by Hepburn, who was directed to remain about two miles above the fall, to arrest the canoes on their passage, lest we should too suddenly surprise the Esquimaux. About ten P.M. we were mortified by the appearance of the Indians with Mr. Wentzel, who had in vain endeavoured to restrain them from following us. The only reason assigned by Akaitcho for this conduct was, that he wished a re-assurance of my promise to establish peace between his nation and the Esquimaux. I took this occasion of pointing out again the necessity of their remaining behind, until we had obtained the confidence and good-will of their enemies. After supper Dr. Richardson ascended a lofty hill about three miles from the encampment, and obtained the first view of the sea; it appeared to be covered with ice. A large promontory, which I named Cape Hearne, bore N.E., and its lofty mountains proved to be the blue land we had seen in the forenoon, and which had led us to believe the sea was still far distant. He saw the sun set a few minutes before midnight from the same elevated situation. It did not rise during the half hour he remained there, but before he reached the encampment its rays gilded the tops of the hills.

The night was warm and we were much annoyed by the musquitoes.

July 15.—We this morning experienced as much difficulty as before in prevailing upon the Indians to remain behind, and they did not consent to do so until I had assured them that they should lose the reward which had been promised, if they proceeded any farther, until we had prepared the Esquimaux to receive them. We left a Canadian with them, and proceeded on our journey, not without apprehension that they would follow us, and derange our whole plan by their obstinacy. Two of the officers and a party of the men walked on the shore, to lighten the canoes. The river, in this part, flows between high sand stone cliffs, reddish slate clay rocks, and shelving banks of white clay, and is full of shoals and dangerous rapids. One of these was termed Escape Rapid, from both the canoes having narrowly escaped foundering in its high waves. We had entered the rapid before we were aware, and the steepness of the cliffs preventing us from landing, we were indebted to the swiftness of our descent for our preservation. Two waves made a complete breach over the canoes; a third would in all probability have filled and overset them, which must have proved fatal to every one in them. The powder fortunately escaped the water, which was soon discharged when we reached the bottom of the rapid. At noon we perceived Hepburn lying on the left bank of the river, and we landed immediately to receive his information. As he represented the water to be shoal the whole way to the rapid, (below which the Esquimaux were,) the shore party were directed to continue their march to a sandy bay at the head of the fall, and there await the arrival of the canoes. The land in the neighbourhood of the rapid, is of the most singular form: large irregular sand hills bounding both banks, apparently so unconnected that they resemble icebergs; the country around them consisting of high round green hills. The river became wide in this part, and full of shoals,

but we had no difficulty in finding a channel through them. On regaining the shore party, we regretted to find that some of the men had incautiously appeared on the tops of the hills, just at the time Augustus was conversing with one of the Esquimaux, who had approached in his canoe, and was almost persuaded to land. The unfortunate appearance of so many people at this instant, revived his fears, and he crossed over to the eastern bank of the river, and fled with the whole of his party. We learned from Augustus that this party, consisting of four men and as many women, had manifested a friendly disposition. Two of the men were very tall. The man who first came to speak to him, inquired the number of canoes that we had with us, expressed himself to be not displeased at our arrival, and desired him to caution us not to attempt running the rapid, but to make the portage on the west side of the river. Notwithstanding this appearance of confidence and satisfaction, it seems they did not consider their situation to be free from danger, as they retreated the first night, to an island somewhat farther down the river, and in the morning they returned and threw down their lodges, as if to give notice to any of their nation that might arrive, that there was an enemy in the neighbourhood. From seeing all their property strewed about, and ten of their dogs left, we entertained the hope that these poor people would return after their first alarm had subsided; and therefore I determined on remaining until the next day, in the expectation of seeing them, as I considered the opening of an early communication to be a matter of the greatest importance in our state of absolute ignorance respecting the sea coast. The canoes and cargoes were carried across the portage, and we encamped on the north side of it. We sent Augustus and Junius across the river to look for the runaways, but their search was fruitless. They put a few pieces of iron and trinkets in their canoes, which were lying on the beach. We also sent some men to put up the stages of fish, and secure them as much as possible from

the attacks of the dogs. Under the covering of their tents were observed some stone kettles and hatchets, a few fish spears made of copper, two small bits of iron, a quantity of skins, and some dried salmon, which was covered with maggots, and half putrid. The entrails of the fish were spread out to dry. A great many skins of small birds were hung up to a stage, and even two mice were preserved in the same way. Thus it would appear that the necessities of these poor people induce them to preserve every article that can be possibly used as food. Several human skulls which bore the marks of violence, and many bones were strewed about the ground near to the encampment, and as the spot exactly answers the description given by Mr. Hearne, of the place where the Chipewyans who accompanied him perpetrated the dreadful massacre on the Esquimaux, we had no doubt of this being the place, notwithstanding the difference in its position as to latitude and longitude given by him, and ascertained by our observation. We have, therefore, preserved the appellation of Bloody Fall, which he bestowed upon it. Its situation by our observations is, in latitude 67° 42′ 35″ N., longitude 115° 49′ 33″ W., variation 50° 20′ 14″ E. This rapid is a sort of shelving cascade, about three hundred yards in length, having a descent of from ten to fifteen feet. It is bounded on each side by high walls of red sand stone, upon which rests a series of lofty green hills. On its north side, close to the east bank, is the low rocky island which the Esquimaux had deserted. The surrounding scenery is accurately delineated in the annexed sketch taken by Mr. Hood but finished by Mr. Back. We caught forty excellent fish of the salmon and white fish species in a single net below the rapid. We had not seen any trees during this day's journey; our fuel consisted of small willows and pieces of dried wood that were picked up near to the encampment. The ground is well clothed with grass, and nourishes most of the shrubs and berry-bearing plants that we have seen north of Fort Enterprise; and the

Drawn by Lieut. Back R.N

Engraved by Edwd. Finden

BLOODY FALL.

July 17. 1821.

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country altogether has a richer appearance than the barren lands of the Copper Indians. We had a distinct view of the sea from the summit of a hill behind the tents; it appeared choked with ice and full of islands.

On the morning of the 16th three men were sent up the river to search for dried wood to make floats for the nets. Adam, the interpreter, was also despatched with a Canadian, to inform Akaitcho of the flight of the Esquimaux. We were preparing to go down to the sea in one of the canoes, leaving Mr. Back to await the return of the men who were absent; but just as the crew were putting the canoe in the water, Adam arrived in the utmost consternation, and informed us that a party of Esquimaux were pursuing the men whom we had sent to collect floats. The orders for embarking were instantly countermanded, and we went with a party of men to their rescue. We soon met our people returning at a slow pace, and learned that they had come unawares upon the Esquimaux party, which consisted of six men, with their women and children, who were travelling towards the rapid with a considerable number of dogs carrying their baggage. The women hid themselves on the first alarm, but the men advanced, and stopping at some distance from our men, began to dance in a circle, tossing up their hands in the air, and accompanying their motions with much shouting, to signify, I conceive, their desire of peace. Our men saluted them by pulling off their hats, and making bows, but neither party was willing to approach the other; and, at length, the Esquimaux retired to the hill, from whence they had descended when first seen. We proceeded in the hope of gaining an interview with them, but lest our appearance in a body should alarm them, we advanced in a long line, at the head of which was Augustus. We were led to their baggage, which they had deserted, by the howling of the dogs; and on the summit of the hill we found, lying behind a stone, an old man, who was too infirm to effect his escape with

the rest, He was much terrified when Augustus advanced, and probably expected immediate death; but that the fatal blow might not be unrevenged, he seized his spear, and made a thrust with it at his supposed enemy. Augustus, however, easily repressed his feeble effort, and soon calmed his fears by presenting him with some pieces of iron, and assuring him of his friendly intentions. Dr. Richardson and I then joined them, and, after receiving our presents, the old man was quite composed, and became communicative. His dialect differed from that used by Augustus, but they understood each other tolerably well.

It appeared that his party consisted of eight men and their families, who were returning from a hunting excursion with dried meat. After being told who we were, he said, that he had heard of white people from different parties of his nation which resided on the sea-coast to the eastward; and to our inquiries respecting the provision and fuel we might expect to get on our voyage, he informed us that the rein-deer frequent the coast during summer, the fish are plentiful at the mouths of the rivers, the seals are abundant, but there are no sea-horses nor whales, although he remembered one of the latter, which had been killed by some distant tribe, having been driven on shore on his part of the coast by a gale of wind. That musk oxen were to be found a little distance up the rivers, and that we should find drift wood along the shore. He had no knowledge of the coast to the eastward beyond the next river, which he called Nappa-arktok-towock, or Tree River. The old man, contrary to the Indian practice, asked each of our names; and, in reply to a similar question on our part, said his was Terre-ganœuck, or the White Fox; and that his tribe denominated themselves Nagge-ook-tor-mœoot, or Deer Horn Esquimaux. They usually frequent the Bloody Fall during this and the following moons, for the purpose of salting salmon, and then retire to a river which flows into the sea, a short way to the westward, (since

denominated Richardson's River,) and pass the winter in snow-houses.

After this conversation Terregannœuck proposed going down to his baggage, and we then perceived he was too infirm to walk without the assistance of sticks. Augustus, therefore, offered him his arm, which he readily accepted, and, on reaching his store, he distributed pieces of dried meat to each person, which, though highly tainted, were immediately eaten; this being an universal token among the Indians of peaceable intention.

We then informed him of our desire to procure as much meat as we possibly could, and he told us that he had a large quantity concealed in the neighbourhood, which he would cause to be carried to us when his people returned.

I now communicated to him that we were accompanied by some Copper Indians, who were very desirous to make peace with his nation, and that they had requested me to prevail upon the Esquimaux to receive them in a friendly manner; to which he replied, he should rejoice to see an end put to the hostility that existed between the nations, and, therefore, would most gladly welcome our companions. Having despatched Adam to inform Akaitcho of this circumstance, we left Terregannœuck, in the hope that his party would rejoin him; but as we had doubts whether the young men would venture upon coming to our tents, on the old man's bare representation, we sent Augustus and Junius back in the evening, to remain with him until they came, that they might fully detail to them our intentions.

The countenance of Terregannœuck was oval, with a sufficiently prominent nose, and had nothing very different from an European face, except in the smallness of his eyes, and, perhaps, in the narrowness of his forehead. His complexion was very fresh and red, and he had a longer beard than I have hitherto seen on any of the aboriginal inhabitants of America. It was between two and three inches long,

and perfectly white. His face was not tattoed. His dress consisted of a shirt, or jacket with a hood, wide breeches, reaching only to the knee, and tight leggins sewed to the shoes, all of deers' skins. The soles of the shoes were made of seal-skin, and stuffed with feathers instead of socks. He was bent with age, but appeared to be about five feet ten inches high. His hands and feet were small in proportion to his height. Whenever Terregannœuck received a present, he placed each article first on his right shoulder, then on his left; and when he wished to express still higher satisfaction, he rubbed it over his head. He held hatchets, and other iron instruments, in the highest esteem. On seeing his countenance in a glass for the first time, he exclaimed, "I shall never kill deer more," and immediately put the mirror down. The tribe to which he belongs repair to the sea in spring, and kill seals; as the season advances they hunt deer and musk oxen at some distance from the coast. Their weapon is the bow and arrow, and they get sufficiently near to the deer, either by crawling, or by leading these animals by ranges of turf towards a spot where the archer can conceal himself. Their bows are formed of three pieces of fir, the centre piece alone bent, the other two lying in the same straight line with the bowstring; the pieces are neatly tied together with sinew. Their canoes are similar to those we saw in Hudson's Straits, but smaller. They get fish constantly in the rivers, and in the sea as soon as the ice breaks up. This tribe does not make use of nets, but they are tolerably successful with the hook and line. Their cooking utensils are made of pot-stone, and they form very neat dishes of fir, the sides being made of thin deal bent into an oval form, secured at the ends by sewing, and fitted so nicely to the bottom as to be perfectly water tight. They have also large spoons made of the horns of the musk oxen.

Akaitcho and the Indians arrived at our tents in the evening, and we learned that they had seen the Esquimaux the day before,

and endeavoured, without success, to open a communication with them. They exhibited no hostile intention, but were afraid to come near. Akaitcho, keeping out of their sight, followed them at a distance, expecting that ultimately finding themselves enclosed between our party and his, they would be compelled to come to a parley with one of us. Akaitcho had seen Terregannœuck soon after our departure; he was much terrified at their approach, and thrust his spear at Akaitcho as he had done at Augustus; but he was soon reconciled after the demonstrations of kindness the Indians made, in cutting off the buttons from their dress to present to him.

July 17.—We waited all this forenoon in momentary expectation of the return of Augustus and Junius, but as they did not appear at two P.M., I sent Mr. Hood, with a party of men, to inquire into the cause of their detention, and to bring the meat which Terregannœuck had promised us. He returned at midnight with the information, that none of the Esquimaux had yet ventured to come near Terregannœuck except his aged wife, who had concealed herself amongst the rocks at our first interview; and she told him the rest of the party had gone to a river, a short distance to the westward, where there was another party of Esquimaux fishing. Augustus and Junius had erected the tent, and done every thing in their power to make the old man comfortable in their absence. Terregannœuck being unable to walk to the place where the meat was concealed, readily pointed the spot out to Mr. Hood, who went thither; but after experiencing much difficulty in getting at the column of rock on which it was deposited, he found the meat too putrid for our use. The features of Terregannœuck's wife were remarkable for roundness and flatness; her face was much tattoed, her dress differed little from the old man's.

In the afternoon a party of nine Esquimaux appeared on the east bank of the river, about a mile below our encampment, carrying

their canoes and baggage on their backs; but they turned and fled as soon as they perceived our tents. The appearance of so many different bands of Esquimaux terrified the Indians to such a degree, that they determined on leaving us the next day, lest they should be surrounded and their retreat cut off. I endeavoured, by the offer of any remuneration they would choose, to prevail upon one or two of the hunters to proceed, but in vain; and I had much difficulty even in obtaining their promise to wait at the Copper Mountains for Mr. Wentzel and the four men, whom I intended to discharge at the sea.

The fears which our interpreters, St. Germain and Adam, entertained respecting the voyage, were now greatly increased, and both of them came this evening to request their discharges, urging that their services could be no longer requisite, as the Indians were going from us. St. Germain even said that he had understood he was only engaged to accompany us as long as the Indians did, and persisted in this falsehood until his agreement to go with us throughout the voyage had been twice read to him. As these were the only two of the party on whose skill in hunting we could rely, I was unable to listen for a moment to their desire of quitting us, and lest they should leave us by stealth, their motions were strictly watched. This was not an unnecessary precaution, as I was informed that they had actually laid a plan for eloping; but the rest of the men knowing that their own safety would have been compromised had they succeeded, kept a watchful eye over them. We knew that the dread of the Esquimaux would prevent these men from leaving us as soon as the Indians were at a distance, and we trusted to their becoming reconciled to the journey when once the novelty of a sea voyage had worn off.

July 18.—As the Indians persevered in their determination of setting out this morning, I reminded them, through Mr. Wentzel and St. Germain, of the necessity of our having the deposit of pro-

vision made at Fort Enterprise, and received a renewed assurance of their attending to that point. They were also desired to put as much meat as they could *en cache* on the banks of the Copper-Mine River on their return. We then furnished them with as much ammunition as we could spare, and they took their departure, promising to wait three days for Mr. Wentzel at the Copper Mountains. We afterwards learned that their fears did not permit them to do so, and that Mr. Wentzel did not rejoin them until they were a day's march to the southward of the mountains.

We embarked at five A.M. and proceeded towards the sea, which is about nine miles distant from the Bloody Fall. After passing a few rapids, the river became wider, and more navigable for canoes, flowing between banks of alluvial sand. We encamped at ten on the western bank at its junction with the sea. The river is here about a mile wide, but very shallow, being barred nearly across by sand-banks, which run out from the main land on each side to a low alluvial island that lies in the centre, and forms two channels; of these the westermost only is navigable even for canoes, the other being obstructed by a stony bar. The islands to seaward are high and numerous, and fill the horizon in many points of the compass; the only open space, seen from an eminence near the encampment, being from N.bE. to N.E.bN. Towards the east the land was like a chain of islands, the ice surrounded the islands apparently in a compact body, leaving a channel between its edge and the main of about three miles. The water in this channel was of a clear green colour, and decidedly salt. Mr. Hearne could have only tasted it at the mouth of the river, when he pronounced it to be merely brackish. A rise and fall of four inches in the water was observed. The shore is strewed with a considerable quantity of drift timber, which is principally of the wood of the *populus balsamifera*, but none of it of great size. We also picked up some decayed wood far out of the reach of the water. A few stunted willows were growing

near the encampment. Some ducks, gulls, and partridges were seen to-day. As I had to make up despatches for England to be sent by Mr. Wentzel, the nets were set in the interim, and we were rejoiced to find that they produced a sufficiency of fish to supply the party. The fish caught were, the Copper-Mine River salmon, white fish, and two species of pleuronectes. We felt a considerable change of temperature on reaching the sea-coast, produced by the winds changing from the southward to the N.W. Our Canadian voyagers complained much of the cold, but they were amused with their first view of the sea, and particularly with the sight of the seals that were swimming about near the entrance of the river, but these sensations gave place to despondency before the evening had elapsed. They were terrified at the idea of a voyage through an icy sea in bark canoes. They speculated on the length of the journey, the roughness of the sea, the uncertainty of provisions, the exposure to cold where we could expect no fuel, and the prospect of having to traverse the barren grounds to get to some establishment. The two interpreters expressed their apprehensions with the least disguise, and again urgently applied to be discharged; but only one of the Canadians made a similar request. Judging that the constant occupation of their time as soon as we were enabled to commence the voyage would prevent them from conjuring up so many causes of fear, and that familiarity with the scenes on the coast, would in a short time enable them to give scope to their natural cheerfulness, the officers endeavoured to ridicule their fears, and happily succeeded for the present. The manner in which our faithful Hepburn viewed the element that he had been so long accustomed to, contributed not a little to make them ashamed of their fears.

On the morning of the 19th Dr. Richardson, accompanied by Augustus, paid another visit to Terregannœuck, to see if he could obtain any additional information respecting the country to the eastward; but he was disappointed at finding that his affrighted family

had not yet rejoined him, and the old man could add nothing to his former communication. The Doctor remarked that Terregannœuck had a great dislike to mentioning the name of the Copper-Mine River, and that he evaded the question with much dexterity as often as it was put to him; but that he willingly told the name of a river to the eastward, and also of his tribe. He attempted to persuade Augustus to remain with him, and offered him one of his daughters for a wife. These Esquimaux strike fire with two stones, catching the sparks in the down of the catkins of a willow.

The despatches being finished were delivered this evening to Mr. Wentzel, who parted from us at eight P.M. with Parent, Gagnier, Dumas, and Forcier, Canadians, whom I had discharged for the purpose of reducing our expenditure of provision as much as possible. The remainder of the party, including officers, amounted to twenty persons. I made Mr. Wentzel acquainted with the probable course of our future proceedings, and mentioned to him that if we were far distant from this river, when the season or other circumstances rendered it necessary to put a stop to our advance, we should, in all probability, be unable to return to it, and should have to travel across the barren grounds towards some established post: in which case I told him that we should certainly go first to Fort Enterprise, expecting that he would cause the Indians to place a supply of dried provision there, as soon as possible after their arrival in its vicinity. My instructions to him were, that he should proceed to Point Lake, transport the canoe that was left there to Fort Enterprise, where he was to embark the instruments and books, and carry them to Slave Lake, and to forward the box containing the journals, &c., with the present despatches by the next winter packet to England. But before he quitted Fort Enterprise, he was to be assured of the intention of the Indians to lay up the provision we required, and if they should be in want of ammunition for that purpose, to procure

it if possible from Fort Providence, or the other forts in Slave Lake, and send it immediately to them by the hunters who accompanied him thither. I also requested him to ascertain from Akaitcho and the other leading Indians, where their different parties would be hunting in the months of September and October, and to leave this information in a letter at Fort Enterprise, for our guidance in finding them, as we should require their assistance. Mr. Wentzel was furnished with a list of the stores that had been promised to Akaitcho and his party as a remuneration for their services, as well as with an official request to the North-West Company that these goods might be paid to them on their next visit to Fort Providence, which they expected to make in the latter part of November. I desired him to mention this circumstance to the Indians as an encouragement to their exertion in our behalf, and to promise them an additional reward for the supply of provision they should collect at Fort Enterprise.

If Mr. Wentzel met the Hook, or any of his party, he was instructed to assure them that he was provided with the necessary documents to get them payment for any meat they should put *en cache* for our use; and to acquaint them, that we fully relied on their fulfilling every part of the agreement they had made with us. Whenever the Indians, whom he was to join at the Copper Mountains, killed any animals on their way to Fort Enterprise, he was requested to put *en cache* whatever meat could be spared, placing conspicuous marks to guide us to them; and I particularly begged he would employ them in hunting in our service, immediately after his arrival at the house.

When Mr. Wentzel's party had been supplied with ammunition, our remaining stock consisted of one thousand balls, and a little more than the requisite proportion of powder. A bag of small shot was missing, and we afterwards discovered that the Canadians had

Drawn by Lieut Back, R.N.

Engraved by Edwd Finden.

VIEW OF THE ARCTIC SEA, FROM THE MOUTH OF THE COPPER MINE RIVER, MIDNIGHT.

July 20. 1821.

secreted and distributed it among themselves, in order that when provision should become scarce, they might privately procure ducks and geese, and avoid the necessity of sharing them with the officers.

The situation of our encampment was ascertained to be, latitude 67° 47′ 50″ N., longitude 115° 36′ 49″ W., the variation of the compass 46° 25′ 52″ E., and dip of the needle 88° 5′ 07″.

It will be perceived, that the position of the mouth of the river, given by our observations, differs widely from that assigned to it by Mr. Hearne; but the accuracy of his description, conjoined with Indian information, assured us that we were at the very part he visited. I have, therefore, named the most conspicuous cape we then saw "Cape Hearne," as a just tribute to the memory of that persevering traveller. I have distinguished another cape by the name of Mackenzie, in honour of Sir Alexander Mackenzie, the only other European* who had before reached the Northern Ocean. I have called the river which falls into the sea, to the westward of the Copper-Mine, Richardson, as a testimony of sincere regard for my friend and companion, Dr. Richardson; and have named the islands, which are in view from our encampment, "Couper's Isles," in honour of a friend of his. The sun set this night at thirty minutes after eleven, apparent time; and the annexed view, taken from a drawing by Mr. Back, shews the appearance of the sky and the prospect at midnight.

The travelling distance from Fort Enterprize to the north of the Copper-Mine River, is about three hundred and thirty-four miles. The canoes and baggage were dragged over snow and ice for one hundred and seventeen miles of this distance.

* Captain Parry's success was at this time unknown to us.

CHAPTER X.

Navigation of the Polar Sea, in two Canoes, as far as Cape Turnagain, to the Eastward, a distance exceeding Five Hundred and Fifty Miles—Observations on the probability of a North-West Passage.

1821. July 20. WE intended to have embarked early this morning, and to have launched upon an element, which was more congenial with our habits than the fresh-water navigations, and their numerous difficulties and impediments we had hitherto encountered, but which was altogether new to our Canadian voyagers. We were detained, however, by a strong north-east gale, which continued the whole day, with constant thunder showers; the more provoking as our nets procured but few fish, and we had to draw upon our store of dried meat; which, with other provision for the journey, amounted only to fifteen days' consumption. Indeed, we should have preferred going dinnerless to bed rather than encroach on our small stock, had we not been desirous of satisfying the appetites, and cheering the spirits, of our Canadian companions at the commencement of our voyage. These thoughtless people would, at any time, incur the hazard of absolute starvation, at a future period, for the present gratification of their appetites; to indulge which they do not hesitate, as we more than once experienced, helping themselves secretly; it being, in their opinion, no disgrace to be caught in the act of pilfering food.

Our only luxury now was a little salt, which had long been our substitute both for bread and vegetables. Since our departure from

Point Lake we had boiled the Indian tea plant, *ledum palustre*, which produced a beverage in smell much resembling rhubarb; notwithstanding which we found it refreshing, and were gratified to see this plant flourishing abundantly, though of dwarfish growth, on the sea-shore.

July 21.—The wind, which had blown strong through the night, became moderate in the morning, but a dense fog prevented us from embarking until noon, when we commenced our voyage on the Hyperborean Sea. Soon afterwards we landed on an island where the Esquimaux had erected a stage of drift timber, and stored up many of their fishing implements and winter sledges, together with a great many dressed seal, musk ox, and deer skins. Their spears headed with bone, and many small articles of the same material, were worked with extreme neatness, as well as their wooden dishes, and cooking utensils of stone; and several articles, very elegantly formed of bone, were evidently intended for some game, but Augustus was unacquainted with their use. We took from this deposit four seal-skins to repair our shoes, and left in exchange a copper-kettle, and some awls and beads.

We paddled all day along the coast to the eastward, on the inside of a crowded range of islands, and saw very little ice; the "blink" of it, however, was visible to the northward, and one small iceberg was seen at a distance. A tide was distinguishable among the islands by the foam floating on the water, but we could not ascertain its direction. In the afternoon St. Germain killed, on an island, a fat deer, which was a great acquisition to us; it was the first we had seen for some months in good condition.

Having encamped on the main shore, after a run of thirty-seven miles, we set up a pole to ascertain the rise and fall of the water, which was repeated at every halting-place, and Hepburn was ordered to attend to the result. We found the coast well covered with vegetation, of moderate height, even in its outline, and easy of

approach. The islands are rocky and barren, presenting high cliffs of a columnar structure. I have named the westernmost group of those we passed "Berens' Isles," in honour of the Governor of the Hudson's Bay Company; and the easternmost, "Sir Graham Moore's Islands." At the spot where we landed some muscle-shells and a single piece of sea-weed lay on the beach; this was the only spot on the coast where we saw shells. We were rejoiced to find the beach strewed with abundance of small drift-wood, none of it recent.

It may be remarked that the Copper-Mine River does not bring down any drift-wood; nor does any other known stream, except Mackenzie's River; hence, from its appearance on this part of the coast, an easterly current may be inferred. This evening we were all in high glee at the progress we had made; the disappearance of the ice, and the continuance of the land in an eastern direction, and our future prospects formed an enlivening subject of conversation. The thermometer varied during the day between 43° and 45°. The fishing nets were set, but produced nothing.

On the 22d we embarked at four A.M., and having the benefit of a light breeze continued our voyage along the coast, under sail, until eleven, when we halted to breakfast, and to obtain the latitude. The coast up to this point presented the same general appearance as yesterday, namely, a gravelly or sandy beach, skirted by green plains; but as we proceeded, the shore became exceedingly rocky and sterile; and, at last, projecting considerably to the northward, it formed a high and steep promontory. Some ice had drifted down upon this cape, which, we feared, might check our progress; but, as the evening was fine, we ventured upon pushing the canoes through the small channels formed among it. After pursuing this kind of navigation, with some danger and more anxiety, we landed and encamped on a smooth rocky point; from whence we perceived, with much satifaction, that the ice consisted only of detached

pieces, which would be removed by the first breeze. We sounded in seventeen fathoms, close to the shore, this day. The least depth ascertained by the lead, since our departure from the river, was six fathoms; and it may be remarked, that any ship might pass safely between the islands and the main. The water is of a light green colour, but not very clear; and it is much less salt than that of the Atlantic, judging from our recollection of its taste. In the course of the day we saw geese and ducks with their young, and two deer; and experienced very great variations of temperature, from the light breezes blowing alternately from the ice and the land. The name of " Lawford's Islands" was bestowed on a group we passed in the course of the day, as a mark of my respect for Vice-Admiral Lawford, under whose auspices I first entered the naval service.

A fresh breeze blowing through the night had driven the ice from the land, and opened a channel of a mile in width; we, therefore, embarked at nine A.M. to pursue our journey along the coast, but at the distance of nine miles were obliged to seek shelter in Port Epworth, the wind having become adverse, and too strong to admit of our proceeding. The Tree River of the Esquimaux which discharges its waters into this bay appears to be narrow, and much interrupted by rapids. The fishing-nets were set, but they obtained only one white fish and a few bull-heads. This part of the coast is the most sterile and inhospitable that can be imagined. One trap cliff succeeds another with a tiresome uniformity, and their debris cover the narrow valleys that intervene, to the exclusion of every kind of herbage. From the summit of these cliffs the ice appeared in every direction.

We obtained the following observations during our stay; latitude 67° 42′ 15″ N., longitude 112° 30′ 00″ W., variation 47° 37′ 42″ E.

The wind abating, at eight P.M. we re-embarked, and soon afterwards discovered, on an island, a rein-deer, which the interpreters

fortunately killed. Resuming our voyage we were much impeded by the ice, and, at length, being unable to force a passage through a close stream that had collected round a cape, we put ashore at four A.M. On the 24th, several stone fox-traps and other traces of the Esquimaux were seen near to the encampment. The horizontal refraction varied so much this morning, that the upper limb of the sun twice appeared at the horizon before it finally rose.

For the last two days the water rose and fell about nine inches. The tides, however, seemed to be very irregular, and we could not determine the direction of the ebb or flood. A current setting to the eastward was running about two miles an hour during our stay. The ice having removed a short distance from the shore, by eleven A.M. we embarked, and with some difficulty effected a passage; then making a traverse across Gray's Bay*, we paddled up under the eastern shore against a strong wind. The interpreters landed here, and went in pursuit of a deer, but had no success. This part of the coast is indented by deep bays, which are separated by peninsulas formed like wedges, sloping many miles into the sea, and joined by low land to the main: so that often mistaking them for islands, we were led by a circuitous route round the bays. Cliffs were numerous on the islands, which were all of the trap formation.

At seven, a thunder-storm coming on, we encamped at the mouth of a river about eighty yards wide and set four nets. This stream, which has received the name of Wentzel, after our late companion, discharges a considerable body of water. Its banks are sandy and clothed with herbage. The Esquimaux had recently piled up some drift timber here. A few ducks, ravens, and snow birds, were seen to-day. The distance we made was thirty-one miles.

July 25.—We had constant rain with thunder during the night. The nets furnished only three salmon-trout. We attributed the

* Named after Mr. Gray, principal of the Belfast Academy. An island which lies across the mouth of this bay bears the name of our English sailor Hepburn.

Drawn by Lieut Back, R.N.

Engraved by Edwd Finden.

EXPEDITION DOUBLING CAPE BARROW, JULY 25. 1821.

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want of greater success to the entrance of some seals into the mouth of the river. Embarking at six A.M. we paddled against a cold breeze, until the spreading of a thick fog caused us to land. The rocks here consisted of a beautiful mixture of red and gray granite, traversed from north to south by veins of red felspar, which were crossed in various directions by smaller veins filled with the same substance.

At noon the wind coming from a favourable quarter tempted us to proceed, although the fog was unabated. We kept as close as we could to the main shore, but having to cross some bays, it became a matter of doubt whether we had not left the main, and were running along an island. Just as we were endeavouring to double a bold cape, the fog partially cleared away, and allowed us an imperfect view of a chain of islands on the outside, and of much heavy ice which was pressing down upon us. The shore near us was so steep and rugged that no landing of the cargoes could be effected, and we were preserved only by some men jumping on the rocks, and thrusting the ice off with poles. There was no alternative but to continue along this dreary shore, seeking a channel between the different masses of ice which had accumulated at the various points. In this operation both the canoes were in imminent danger of being crushed by the ice, which was now tossed about by the waves that the gale had excited. The annexed print, from a drawing by Mr. Back, will give the reader some idea of the peril of our situation, and the dreariness of our prospect. We effected a passage, however, and keeping close to the shore, landed at the entrance of Detention Harbour at nine P.M., having come twenty-eight miles. An old Esquimaux encampment was traced on this spot; and an ice chisel, a copper knife, and a small iron knife were found under the turf. I have named this cape after Mr. Barrow of the Admiralty, to whose exertions are mainly owing the discoveries that have recently been made in Arctic geography. An opening on its eastern

side has received the appellation of Inman Harbour, after my friend the Professor at the Royal Naval College, Portsmouth; and to a group of islands to seaward of it, we gave the name of Jameson, in honour of the distinguished Professor of Mineralogy at Edinburgh.

We had much wind and rain during the night; and by the morning of the 26th a great deal of ice had drifted into the inlet. We embarked at four and attempted to force a passage, when the first canoe got enclosed, and remained for some time in a very perilous situation: the pieces of ice, crowded together by the action of the current and wind, pressing strongly against its feeble sides. A partial opening, however, occurring, we landed without having sustained any serious injury. Two men were then sent round the bay, and it was ascertained that instead of having entered a narrow passage between an island and the main, we were at the mouth of a harbour, having an island at its entrance; and that it was necessary to return by the way we came, and get round a point to the northward. This was, however, impracticable, the channel being blocked up by drift ice; and we had no prospect of release except by a change of wind. This detention was extremely vexatious, as we were losing the benefit of a fair wind, and expending our stock of provision. In the afternoon the weather cleared up, and several men went hunting, but they were unsuccessful. During the day the ice floated backwards and forwards in the harbour, moved by currents, not regular enough to deserve the name of tide, and which appeared to be governed by the wind. We perceived great diminution by melting in the pieces near us. That none of this ice survives the summer is evident, from the rapidity of its decay; and because no ice of last year's formation was hanging on the rocks. Whether any body of it exists at a distance from the shore, we cannot determine.

The land around Cape Barrow, and to Detention Harbour, consists of steep craggy mountains of granite, rising so abruptly

from the water's edge, as to admit of few landing-places even for a canoe. The higher parts attain an elevation of one thousand four hundred or one thousand five hundred feet; and the whole is entirely destitute of vegetation.

On the morning of the 27th the ice remaining stationary at the entrance, we went to the bottom of the harbour, and carried the canoes and cargoes about a mile and a half across the point of land that forms the east side of it; but the ice was not more favourable there for our advancement than at the place we had left. It consisted of small pieces closely packed together by the wind extending along the shore, but leaving a clear passage beyond the chain of islands with which the whole of this coast is girt. Indeed, when we started we had little hope of finding a passage; and the principal object in moving was, to employ the men, in order to prevent their reflecting upon and discussing the dangers of our situation, which we knew they were too apt to do when leisure permitted. Our observations place the entrance of Detention Harbour in latitude 67° 53′ 45″, longitude 110° 41′ 20″ W., variation 40° 49′ 34″ E. It is a secure anchorage, being sheltered from the wind in every direction; the bottom is sandy.

July 28.—As the ice continued in the same state, several of the men were sent out to hunt; and one of them fired no less than four times at deer, but unfortunately without success. It was satisfactory, however, to ascertain that the country was not destitute of animals. We had the mortification to discover that two of the bags of pemmican, which was our principal reliance, had become mouldy by wet. Our beef too had been so badly cured, as to be scarcely eatable, this was occasioned by our having been compelled, through haste, to dry it by fire instead of the sun. It was not, however, the quality of our provision that gave us uneasiness, but its diminution, and the utter incapacity to obtain any addition. Seals were the only

animals that met our view at this place, and these we could never approach.

Dr. Richardson discovered near the beach a small vein of galena, traversing gneiss rocks, and the people collected a quantity of it in the hope of adding to our stock of balls; but their endeavours to smelt it, were, as may be supposed, ineffectual. The drift timber on this part of the coast consists of pine and tacca mahac, *(bopulus palsamifera)* most probably from Mackenzie's, or some other river to the eastward of the Copper-Mine. It all appears to have lain long in the water, the bark being completely worn off, and the ends of the pieces rubbed perfectly smooth. There was a sharp frost last night, which formed a pretty thick crust of ice in a kettle of water that stood in the tents; and for several nights past thin films of ice have been formed on the salt water amongst the cakes of stream ice*. Notwithstanding this state of temperature, we were tormented by swarms of musquitoes; we had persuaded ourselves that these pests could not sustain the cold in the vicinity of the sea, but it appears they haunt every part of this country in defiance of climate. Mr. Back made an excursion to a hill at seven or eight miles distance, and from its summit he perceived the ice close to the shore as far as his view extended.

On the morning of the 29th the party attended divine service. About noon the ice appearing less compact, we embarked to change our situation, having consumed all the fuel within our reach. The wind came off the land just as the canoes had started, and we determined on attempting to force a passage along the shore; in which we fortunately succeeded, after seven hours' labour and much hazard to our frail vessels. The ice lay so close that the crews disembarked on it, and effected a passage by bearing against the pieces with their

* This is termed *bay ice* by the Greenland-men.

poles; but in conducting the canoes through the narrow channels thus formed, the greatest care was requisite, to prevent the sharp projecting points from breaking the bark. They fortunately received no material injury, though they were split in two places.

At the distance of three miles, we came to the entrance of a deep bay, whose bottom was filled by a body of ice so compact as to preclude the idea of a passage through it; whilst at the same time, the traverse across its mouth was attended with much danger, from the approach of a large field of ice, which was driving down before the wind. The dread of further detention, however, prevented us from hesitating; and we had the satisfaction of landing in an hour and a half on the opposite shore, where we halted to repair the canoes, and to dine. I have named this bay after my friend Mr. Daniel Moore of Lincoln's Inn; to whose zeal for science, the Expedition was indebted for the use of a most valuable chronometer. Its shores are picturesque; sloping hills receding from the beach, and clothed with verdure, bound its bottom and western side; and lofty cliffs of slate clay, with their intervening grassy valleys, skirt its eastern border. Embarking at midnight, we pursued our voyage without interruption, passing between the Stockport and Marcet Islands and the main, until six A.M. on July 30th; when, having rounded Point Kater, we entered Arctic Sound, and were again involved in a stream of ice, but after considerable delay extricated ourselves, and proceeded towards the bottom of the inlet in search of the mouth of a river, which we supposed it to receive, from the change in the colour of the water.

About ten A.M. we landed, to breakfast on a small deer which St. Germain had killed; and sent men in pursuit of some others in sight, but with which they did not come up. Re-embarking, we passed the river without perceiving it, and entered a deep arm of the sound; which I have named Baillie's Cove, in honour of a

relative of the lamented Mr. Hood. As it was too late to return, we encamped, and by walking across the country, discovered the river, whose mouth being barred by low sandy islands and banks, was not perceived when we passed it. Course and distance from Galena Point to this encampment, were S.E.$\frac{S}{4}$S.—forty-one miles.

From the accounts of Black-meat and Boileau at Fort Chipewyan, we considered this river to be the Anatessy; and Cape Barrow to be the projection which they supposed to be the N.E. termination of America. The outline of the coast, indeed, bears some resemblance to the chart they sketched; and the distance of this river from the Copper-Mine, nearly coincides with what we estimated the Anatessy to be, from their statements, In our subsequent journey, however, across the barren grounds, we ascertained that this conjecture was wrong, and that the Anatessy, which is known to come from Rum Lake, must fall into the sea to the eastward of this place.

Our stock of provision being now reduced to eight days' consumption, it had become a matter of the first importance to obtain a supply; and as we had learned from Terregannœuck that the Esquimaux frequent the rivers at this season, I determined on seeking a communication with them here, with the view of obtaining relief for our present wants, or even shelter for the winter, if the season should prevent us from returning either to the Hook's party, or Fort Enterprise; and I was the more induced to take this step at this time, as several deer had been seen to-day, and the river appeared good for fishing: which led me to hope we might support the party during our stay, if not add to our stock by our own exertions in hunting and fishing. Augustus, Junius, and Hepburn, were therefore furnished with the necessary presents, and desired to go along the bank of the river as far as they could, on the following day, in search of the natives, to obtain provision and leather, as well as information respecting the coast.

They started at four A.M., and at the same time our hunters were sent off in search of deer; and the rest of the party proceeded in the canoes to the first cascade in the river, at the foot of which we encamped, and set four nets. This cascade, produced by a ridge of rocks crossing the stream, is about three or four feet in height, and about two hundred and fifty yards wide. Its position by our observations is latitude 67° 19′ 23″ N., longitude 109° 44′ 30″ W., variation 41° 43′ 22″, dip 88° 58′ 48″. I have named this river Hood, as a small tribute to the memory of our lamented friend and companion. It is from three to four hundred yards wide below the cascade, but it is in many places very shallow. The banks, bottom, and adjacent hills, are formed of a mixture of sand and clay. The ground was overspread with small willows and the dwarf birch, both too diminutive for fuel; and the stream brought down no drift wood. We were mortified to find the nets only procured one salmon and five white fish, and that we had to make another inroad upon our dried meat.

August 1.—At two this morning the hunters returned with two small deer and a brown bear. Augustus and Junius arrived at the same time, having traced the river twelve miles further up, without discovering any vestige of inhabitants. We had now an opportunity of gratifying our curiosity respecting the bear so much dreaded by the Indians, and of whose strength and ferocity we had heard such terrible accounts. It proved to be a lean male of a yellowish brown colour, and not longer than a common black bear. It made a feeble attempt to defend itself, and was easily despatched. The flesh was brought to the tent, but our fastidious voyagers supposing, from its leanness, the animal had been sickly, declined eating it; the officers, however, being less scrupulous, boiled the paws, and found them excellent.

We embarked at ten A.M., and proceeding down the river, took on board another deer that had been killed by Credit last evening.

We then ran along the eastern shore of Arctic Sound, distinguished by the name of Banks' Peninsula, in honour of the late Right Honourable Sir Joseph Banks, President of the Royal Society; and rounding Point Wollaston at its eastern extremity, opened another extensive sheet of water; and the remainder of the afternoon was spent in endeavouring to ascertain, from the tops of the hills, whether it was another bay, or merely a passage enclosed by a chain of islands. Appearances rather favouring the latter opinion, we determined on proceeding through it to the southward. During the delay four more deer were killed, all young and lean. It appears that the coast is pretty well frequented by rein-deer at this season; but it is rather singular, that hitherto we have killed none (excepting the first) but young ones of last season, which were all too lean to have been eaten by any but persons who had no choice.

We paddled along the western shore with the intention of encamping, but were prevented by the want of drift wood on the beach. This induced us to make a traverse to an island, where we put up at midnight, having found a small bay, whose shores furnished us with a little fire-wood. A heavy gale came on from the westward, attended with constant rain, and one of the squalls overthrew our tents. The course and distance made to-day were north-east sixteen miles and a half. I may here mention, that Arctic Sound appears to be the most convenient, and perhaps the best, place for ships to anchor that we have seen along the coast; at this season especially, when they might increase their stock of provision, if provided with good marksmen. Deer are numerous in its vicinity, musk-oxen also may be found up Hood's River, and the fine sandy bottom of the bays promise favourably for fishing with the seine. The hills on the western side are even in their outline and slope gradually to the water's edge. The rocks give place to an alluvial sandy soil, towards the bottom of the Sound; but on Banks' Peninsula rocky eminences again prevail, which are rugged

and uneven, but they are intersected by valleys, now green; along their base is a fine sandy beach. From Point Wollaston to our present encampment the coast is skirted with trap cliffs, which have often a columnar form, and are very difficult of access. These cliffs lie in ranges parallel to the shore, and the deer that we killed were feeding in small marshy grassy plats that lie in the valleys between them.

Being detained by the continuance of the gale, on the 2d of August some men were sent out to hunt, and the officers visited the tops of the highest hills, to ascertain the best channels to be pursued. The wind abating at ten P.M., we embarked and paddled round the southern end of the island, and continued our course to the south-east. Much doubt at this time prevailed as to the land on the right being the main shore, or merely a chain of islands. The latter opinion was strengthened by the broken appearance of the land, and the extensive view we had up Brown's Channel, (named after my friend Mr. Robert Brown,) the mouth of which we passed, and were in some apprehension of being led away from the main shore; and, perhaps, after passing through a group of islands, of coming to a traverse greater than we durst venture upon in canoes. On the other hand, the continuous appearance of the land on the north side of the channel, and its tending to the southward, produced a fear that we were entering a deep inlet.

In this state of doubt we landed often, and endeavoured, from the summits of the highest hills adjoining the shore, to ascertain the true nature of the coast, but in vain, and we continued paddling through the channel all night against a fresh breeze, which, at half past four, increased to a violent gale, and compelled us to land. The gale diminished a short time after noon on the 3d, and permitted us to re-embark and continue our voyage until four P.M., when it returned with its former violence, and finally obliged us to

encamp, having come twenty-four miles on a south-east three-quarter south course.

From the want of drift wood to make a fire we had fasted all day, and were under the necessity, in the evening, of serving out pemmican, which was done with much reluctance, especially as we had some fresh deers' meat remaining. The inlet, when viewed from a high hill adjoining to our encampment, exhibited so many arms, that the course we ought to pursue was more uncertain than ever. It was absolutely necessary, however, to see the end of it before we could determine that it was not a strait. Starting at three A.M., on the 4th, we paddled the whole day through channels, from two to five or six miles wide, all tending to the southward. In the course of the day's voyage we ascertained, that the land which we had seen on our right hand since yesterday morning, consisted of several large islands, which have been distinguished by the names of Goulburn, Elliot, and Young; but the land on our left preserved its unbroken appearance, and when we encamped, we were still uncertain whether it was the eastern side of a deep sound or merely a large island. It differed remarkably from the main shore, being very rugged, rocky, and sterile, whereas the outline of the main on the opposite side was even, and its hills covered with a comparatively good sward of grass, and exhibited little naked rock. There was no drift timber, but the shores near the encampment were strewed with small pieces of willow, which indicated our vicinity to the mouth of a river. This fuel enabled us to make a hearty supper off a small deer killed this evening.

The shallows we passed to-day were covered with shoals of *capelin*, the angmaggœiik of the Esquimaux. It was known to Augustus, who informed us that it frequents the coast of Hudson's Bay, and is delicate eating. The course and distance made was, south by east half east, thirty-three miles.

After paddling twelve miles in the morning of the 5th, we had the mortification to find the inlet terminated by a river; the size of which we could not ascertain, as the entrance was blocked by shoals. Its mouth lies in lat. 66° 30′ N., long. 107° 53′ W. I have named this stream Back, as a mark of my friendship for my associate*. We were somewhat consoled for the loss of time in exploring this inlet, by the success of Junius in killing a musk-ox, the first we had seen on the coast; and afterwards by the acquisition of the flesh of a bear, that was shot as we were returning up the eastern side in the evening. The latter proved to be a female, in very excellent condition; and our Canadian voyagers, whose appetite for fat meat is insatiable, were delighted.

We encamped on the shores of a sandy bay, and set the nets; and finding a quantity of dried willows on the beach, we were enabled to cook the bear's flesh, which was superior to any meat we had tasted on the coast. The water fell two feet at this place during the night. Our nets produced a great variety of fish, namely, a salmon-trout, some round fish, tittameg, bleak, star-fish, several herrings, and a flat fish resembling plaice, but covered on the back with horny excrescences.

On the 6th we were detained in the encampment by stormy weather until five P.M., when we embarked and paddled along the northern shore of the inlet; the weather still continuing foggy, but the wind moderate. Observing on the beach a she bear with three young ones, we landed a party to attack them; but, being approached without due caution, they took the alarm and scaled a precipitous rocky hill, with a rapidity that baffled all pursuit. At eight o'clock, the fog changing into rain, we encamped. Many seals were seen to-day, but as they kept in deep water we did not fire at them.

On August 7th the atmosphere was charged with fog and rain all

* From subsequent conversation with the Copper Indians, we were inclined to suppose this may be the Thlueetessy, described by Black-meat, mentioned in a former part of the narrative.

the day, but as the wind was moderate we pursued our journey; our situation, however, was very unpleasant, being quite wet and without room to stretch a limb, much less to obtain warmth by exercise. We passed a cove, which I have named after my friend Mr. W. H. Tinney; and proceeded along the coast until five P.M., when we put up on a rocky point nearly opposite to our encampment on the 3d, having come twenty-three miles on a north-north-west course.

We were detained on the 8th by a northerly gale, which blew violently throughout the day, attended by fog and rain. Some of the men went out to hunt, but they saw no other animal than a white wolf, which could not be approached. The fresh meat being expended, a little pemmican was served out this evening.

The gale abated on the morning of the 9th; and the sea, which it had raised, having greatly subsided, we embarked at seven A.M., and after paddling three or four miles, opened Sir J. A. Gordon's Bay, into which we penetrated thirteen miles, and then discovered from the summit of a hill that it would be vain to proceed in this direction, in search of a passage out of the inlet.

Our breakfast diminished our provision to two bags of pemmican, and a single meal of dried meat. The men began to apprehend absolute want of food, and we had to listen to their gloomy forebodings of the deer entirely quitting the coast in a few days. As we were embarking, however, a large bear was discovered on the opposite shore, which we had the good fortune to kill; and the sight of this fat meat relieved their fears for the present. Dr. Richardson found in the stomach of this animal the remains of a seal, several marmots *(arctomys Richardsonii)*, a large quantity of the liquorice root of Mackenzie *(hedysarum)* which is common on these shores, and some berries. There was also intermixed with these substances a small quantity of grass.

We got again into the main inlet, and paddled along its eastern

shore until forty minutes after eight A.M., when we encamped in a small cove. We found a single log of drift wood; it was pine, and sufficiently large to enable us to cook a portion of the bear, which had a slight fishy taste, but was deemed very palatable.

August 10.—We followed up the east border of the inlet about twenty-four miles, and at length emerged into the open sea; a body of islands to the westward concealing the channel by which we had entered. Here our progress was arrested by returning bad weather. We killed a bear and its young cub of this year, on the beach near to our encampment. We heartily congratulated ourselves at having arrived at the eastern entrance of this inlet, which had cost us nine invaluable days in exploring. It contains several secure harbours, especially near the mouth of Back's River, where there is a sandy bottom in forty fathoms. There also fish are plentiful, and rein-deer and musk-oxen may be procured at this season, by spending a little time in hunting.

On the 3d and 4th of August we observed a fall of more than two feet in the water during the night. There are various irregular and partial currents in the inlet, which may be attributed to the wind. I have distinguished it by the name of Bathurst's Inlet, in honour of the noble Secretary of State, under whose orders I had the honour to act. It runs about seventy-six miles south-east from Cape Everitt, but in coasting its shores we went about one hundred and seventy-four geographical miles. It is remarkable that none of the Indians with whom we had spoken had mentioned this inlet; and we subsequently learned, that in their journeys they strike across from the mouth of one river to the mouth of another, without tracing the intermediate line of coast.

August 11.—Embarking at five A.M., we rounded Point Everitt, and then encountered a strong breeze and heavy swell, which by causing the canoes to pitch very much, greatly impeded our progress. Some deer being seen grazing in a valley near the beach,

we landed, and sent St. Germain and Adam in pursuit of them, who soon killed three which were very small and lean. Their appearance, however, quite revived the spirits of our men, who had suspected that the deer had retired to the woods. It would appear, from our not having seen any in passing along the shores of Bathurst's Inlet, that at this season they confine themselves to the sea-coast and the islands. The magpie berries *(arbutus alpina)* were found quite ripe at this place, and very abundant on the acclivities of the hills. We also ascended the highest hill, and gained a view of a distant chain of islands, extending as far as the eye could reach, and perceived a few patches of ice still remaining near to some of them; but in every other part the sea was quite open. Resuming our voyage after noon, we proceeded along the coast, which is fringed by islands; and, at five P.M., entered another bay, where we were for some time involved in our late difficulties by the intricacy of the passages; but we cleared them in the afternoon, and encamped near the northern entrance of the bay, at a spot which had recently been visited by a small party of Esquimaux, as the remains of some eggs, containing young, were lying beside some half-burnt fire-wood. There were also several piles of stones put up by them. I have named this bay after my friend. Captain David Buchan, of the Royal Navy. It appears to be a safe anchorage, being well sheltered from the wind and sea by islands; the bottom is sandy. Its shores are high, and composed of red sand-stone. Two deer were seen on its beach, but could not be approached. The distance we made to-day was eighteen miles and three-quarters.

Embarking at four on the morning of the 12th, we proceeded against a fresh piercing north-east wind, which raised the waves to a height that quite terrified our people, accustomed only to the navigation of rivers and lakes. We were obliged, however, to persevere in our advance, feeling, as we did, that the short season for our

operations was hastening away; but after rounding Cape Croker the wind became so strong that we could proceed no further. The distance we had made being only six miles on a north-east by east course. The shore on which we encamped is formed of the debris of red sand-stone, and is destitute of vegetation. The beach furnished no drift wood, and we dispensed with our usual meal rather than expend our pemmican. Several deer were seen, but the hunters could not approach them; they killed two swans. We observed the latitude 68° 1′ 20″, where we halted to breakfast this morning.

August 13.—Though the wind was not much diminished, we were urged, by the want of fire-wood, to venture upon proceeding. We paddled close to the shore for some miles, and then ran before the breeze with reefed sails, scarcely two feet in depth. Both of the canoes received much water, and one of them struck twice on sunken rocks. At the end of eighteen miles we halted to breakfast in a bay, which I have named after Vice-Admiral Sir William Johnstone Hope, one of the Lords of the Admiralty.

We found here a considerable quantity of small willows, such as are brought down by the rivers we have hitherto seen; and hence we judged, that a river discharges itself into the bottom of this bay. A paddle was also found, which Augustus, on examination, declared to be made after the fashion of the White Goose Esquimaux, a tribe with whom his countrymen had had some trading communication, as has been mentioned in a former part of the Narrative.

This morning we passed the embouchure of a pretty large stream, and saw the vestiges of an Esquimaux encampment, not above a month old. Having obtained the latitude 68° 6′ 40″ N., we recommenced our voyage under sail, taking the precaution to embark all the pieces of willow we could collect, as we had found the drift wood become more scarce as we advanced. Our course was directed

to a distant point, which we supposed to be a cape, and the land stretching to the westward of it to be islands; but we soon found ourselves in an extensive bay, from which no outlet could be perceived but the one by which we had entered. After examining, however, from the top of a hill, we found a winding shallow passage running to the north-west, which we followed for a short time, and then encamped, having come twenty-three miles, north by east half east.

Some articles left by the Esquimaux attracted our attention; we found a winter sledge raised upon four stones, with some snow-shovels, and a small piece of whalebone. An ice-chisel, a knife, and some beads, were left at this pile. The shores of this bay, which I have named after Sir George Warrender, are low and clayey, and the country for many miles is level, and much intersected with water; but we had not leisure to ascertain whether they were branches of the bay or fresh-water lakes. Some white geese were seen this evening, and some young gray ones were caught on the beach, being unable to fly. We fired at two rein-deer, but without success.

On August 14th we paddled the whole day along the northern shores of the sound, returning towards its mouth. The land which we were now tracing is generally so flat, that it could not be descried from the canoes at the distance of four miles, and is invisible from the opposite side of the sound, otherwise a short traverse might have saved us some days. The few eminences that are on this side were mistaken for islands when seen from the opposite shore; they are for the most part cliffs of basalt, and are not above one hundred feet high; the subjacent strata are of white sand-stone. The rocks are mostly confined to the capes and shores, the soil inland being flat, clayey, and barren. Most of the headlands shewed traces of visits from the Esquimaux, but none of them recent. Many ducks were seen to-day, belonging to a species termed by the voyagers,

from their cry, "caccawees." We also saw some gray geese and swans. The only seal we procured during our voyage, was killed this day; it happened to be blind, and our men imagining it to be in bad health, would not taste the flesh; we, however, were less nice.

We encamped at the end of twenty-four miles' march, on the north-west side of a bay, to which I have given the name of my friend Captain Parry, now employed in the interesting research for a North-West Passage. Drift wood had become very scarce, and we found none near the encampment; a fire, however, was not required, as we served out pemmican for supper, and the evening was unusually warm.

On the following morning the breeze was fresh, and the waves rather high. In paddling along the west side of Parry's Bay, we saw several deer, but owing to the openness of the country, the hunters could not approach them. They killed, however, two swans that were moulting, several cranes, and many gray geese. We procured also some caccawees, which were then moulting and assembled in immense flocks. In the evening, having rounded Point Beechy, and passed Hurd's Islands, we were exposed to much inconvenience and danger from a heavy rolling sea; the canoes receiving many severe blows, and shipping a good deal of water, which induced us to encamp at five P.M. opposite to Cape Croker, which we had passed on the morning of the 12th; the channel, which lay between our situation and it, being about seven miles wide. We had now reached the northern point of entrance into this sound, which I have named in honour of Lord Viscount Melville, the First Lord of the Admiralty. It is thirty miles wide from east to west, and twenty from north to south; and in coasting it we had sailed eighty-seven and a quarter geographical miles. Shortly after the tents were pitched, Mr. Back reported from the steersmen that both canoes had sustained material injury during this day's voyage. I

found on examination that fifteen timbers of the first canoe were broken, some of them in two places, and that the second canoe was so loose in the frame that its timbers could not be bound in the usual secure manner, and consequently there was danger of its bark separating from the gunwales if exposed to a heavy sea. Distressing as were these circumstances, they gave me less pain than the discovery that our people, who had hitherto displayed in following us through dangers and difficulties no less novel than appalling to them, a courage beyond our expectation, now felt serious apprehensions for their safety, which so possessed their minds that they were not restrained even by the presence of their officers from expressing them. Their fears, we imagined, had been principally excited by the interpreters, St. Germain and Adam, who from the outset had foreboded every calamity; and we now strongly suspected that their recent want of success in their hunting excursions, had proceeded from an intentional relaxation in their efforts to kill deer, in order that the want of provision might compel us to put a period to our voyage.

I must now mention that many concurrent circumstances had caused me, during the few last days, to meditate on the approach of this painful necessity. The strong breezes we had encountered for some days, led me to fear that the season was breaking up, and severe weather would soon ensue, which we could not sustain in a country destitute of fuel. Our stock of provision was now reduced to a quantity of pemmican only sufficient for three days' consumption, and the prospect of increasing it was not encouraging, for though rein-deer were seen, they could not be easily approached on the level shores we were now coasting, besides it was to be apprehended they would soon migrate to the south. It was evident that the time spent in exploring the Arctic and Melville Sounds, and Bathurst's Inlet, had precluded the hope of reaching Repulse Bay, which at the outset of the voyage we had fondly cherished; and it

was equally obvious that as our distance from any of the trading establishments would increase as we proceeded, the hazardous traverse across the barren grounds, which we should have to make, if compelled to abandon the canoes upon any part of the coast, would become greater.

I this evening communicated to the officers my sentiments on these points, as well as respecting our return, and was happy to find that their opinions coincided with my own. We were all convinced of the necessity of putting a speedy termination to our advance, as the hope which we had cherished of meeting the Esquimaux and procuring provision from them, could now scarcely be entertained; but yet we were desirous of proceeding, until the land should be seen trending again to the eastward; that we might be satisfied of its separation from what we had conceived, in passing from Cape Barrow to Bathurst's Inlet, to be a great chain of islands. As it was necessary, however, at all events, to set a limit to our advance, I announced my determination of returning after four days' examination, unless, indeed, we should previously meet the Esquimaux, and be enabled to make some arrangement for passing the winter with them. This communication was joyfully received by the men, and we hoped that the industry of our hunters being once more excited, we should be able to add to our stock of provision.

It may here be remarked that we observed the first regular return of the tides in Warrender's and Parry's Bays; but their set could not be ascertained. The rise of water did not amount to more than two feet. Course to-day south one quarter east—nine miles and a quarter.

August 16.—Some rain fell in the night, but the morning was unusually fine. We set forward at five A.M., and the men paddled cheerfully along the coast for ten miles, when a dense fog caused us to land on Slate-clay Point. Here we found more traces of the

Esquimaux, and the skull of a man placed between two rocks. The fog dispersed at noon, and we discerned a group of islands to the northward, which I have named after Vice-Admiral Sir George Cockburn, one of the Lords of the Admiralty. Re-embarking, we rounded the point and entered Walker's Bay, where, as in other instances, the low beach which lay between several high trap cliffs, could not be distinguished until we had coasted down the east side nearly to the bottom of the bay. When the continuity of the land was perceived, we crossed to the western shore, and on landing, discovered a channel leading through a group of islands. Having passed through this channel, we ran under sail by the Porden Islands, across Riley's Bay, and rounding a cape which now bears the name of my lamented friend Captain Flinders, had the pleasure to find the coast trending north-north-east, with the sea in the offing unusually clear of islands; a circumstance which afforded matter of wonder to our Canadians, who had not previously had an uninterrupted view of the ocean.

Our course was continued along the coast until eight P.M., when a change in the wind and a threatening thunder squall induced us to encamp; but the water was so shallow, that we found some difficulty in approaching the shore. Large pieces of drift wood gave us assurance that we had finally escaped from the bays. Our tents were scarcely pitched before we were assailed by a heavy squall and rain, which was succeeded by a violent gale from west-north-west; which thrice overset the tents in the course of the night. The wind blew with equal violence on the following day, and the sea rolled furiously upon the beach. The Canadians had now an opportunity of witnessing the effect of a storm upon the sea; and the sight increased their desire of quitting it.

Our hunters were sent out, and saw many deer, but the flatness of the country defeated their attempts to approach them; they

Drawn by Lieut. [illegible]ck. R.N.

Engraved by Edwd Finden.

EXPEDITION ENCAMPED AT POINT TULNAGAIN.

Augt 21 1821.

brought, however, a few unfledged geese. As there was no appearance of increasing our stock of provision, the allowance was limited to a handful of pemmican, and a small portion of portable soup to each man per day. The thermometer this afternoon stood at 41°. The following observations were obtained: latitude 68° 18′ 50″ N., longitude 110° 5′ 15″ W.; but 109° 25′ 00″ W. was used in the construction of the chart, as the chronometers were found, on our return to Hood's River, to have altered their rates; variation 44° 15′ 46″ E., and dip of the needle 89° 31′ 12″.

On August 18th the stormy weather and sea continuing, there was no prospect of our being able to embark. Dr. Richardson, Mr. Back, and I, therefore, set out on foot to discover whether the land within a day's march, inclined more to the east. We went from ten to twelve miles along the coast, which continued flat, and kept the same direction as the encampment. The most distant land we saw had the same bearing north-north-east, and appeared like two islands, which we estimated to be six or seven miles off; the shore on their inside seemingly trended more to the east, so that it is probable Point Turnagain, for so this spot was named, forms the pitch of a low flat cape.

Augustus killed a deer in the afternoon, but the men were not able to find it. The hunters found the burrows of a number of white foxes, and Hepburn killed one of these animals, which proved excellent eating, esteemed by us as equal to the young geese, with which it was boiled, and far superior to the lean deer we had upon the coast. Large flocks of geese passed over the tents, flying to the southward. The lowest temperature to-day was 38°.

Though it will appear from the chart, that the position of Point Turnagain is only six degrees and a half to the east of the mouth of the Copper-Mine River; we sailed, in tracing the deeply-indented coast, five hundred and fifty-five geographic miles, which is little

less than the direct distance between the Copper-Mine River and Repulse Bay; supposing the latter to be in the longitude assigned to it by Middleton.

When the many perplexing incidents which occurred during the survey of the coast are considered in connexion with the shortness of the period, during which operations of the kind can be carried on, and the distance we had to travel before we could gain a place of shelter for the winter, I trust it will be judged that we prosecuted the enterprise as far as was prudent, and abandoned it only under a well-founded conviction that a further advance would endanger the lives of the whole party, and prevent the knowledge of what had been done from reaching England. The active assistance I received from the officers, in contending with the fears of the men, demands my warmest gratitude.

Our researches, as far as they have gone, seem to favour the opinion of those who contend for the practicability of a North-West Passage. The general line of coast probably runs east and west, nearly in the latitude assigned to Mackenzie's River, the Sound into which Kotzebue entered, and Repulse Bay; and very little doubt can, in my opinion, be entertained of the existence of a continued sea, in or about that line of direction. The existence of whales too, on this part of the coast, evidenced by the whalebone we found in Esquimaux Cove, may be considered as an argument for an open sea; and a connexion with Hudson's Bay is rendered more probable from the same kind of fish abounding on the coasts we visited, and on those to the north of Churchill River. I allude more particularly to the Capelin or Salmo Arcticus, which we found in large shoals in Bathurst's Inlet, and which not only abounds, as Augustus told us, in the bays in his country, but swarms in the Greenland firths*.

* Arctic Zoology, vol. ii, p. 394.

The portion of the sea over which we passed is navigable for vessels of any size; the ice we met, particularly after quitting Detention Harbour, would not have arrested a strong boat. The chain of islands affords shelter from all heavy seas, and there are good harbours at convenient distances. I entertain, indeed, sanguine hopes that the skill and exertions of my friend Captain Parry will soon render this question no longer problematical. His task is doubtless an arduous one, and, if ultimately successful, may occupy two and perhaps three seasons; but confiding as I do, from personal knowledge, in his perseverance and talent for surmounting difficulties, the strength of his ships, and the abundance of provisions with which they are stored, I have very little apprehension of his safety. As I understand his object was to keep the coast of America close on board, he will find in the spring of the year, before the breaking up of the ice can permit him to pursue his voyage, herds of deer flocking in abundance to all parts of the coast, which may be procured without difficulty; and, even later in the season, additions to his stock of provision may be obtained on many parts of the coast, should circumstances give him leisure to send out hunting parties. With the trawl or seine nets also, he may almost every where get abundance of fish even without retarding his progress. Under these circumstances I do not conceive that he runs any hazard of wanting provisions, should his voyage be prolonged even beyond the latest period of time which is calculated upon. Drift timber may be gathered at many places in considerable quantities, and there is a fair prospect of his opening a communication with the Esquimaux, who come down to the coast to kill seals in the spring, previous to the ice breaking up; and from whom, if he succeeds in conciliating their good-will, he may obtain provision, and much useful assistance.

If he makes for Copper-Mine River, as he probably will do, he

will not find it in the longitude as laid down on the charts; but he will probably find what would be more interesting to him, a post, which we erected on the 26th August at the mouth of Hood's River, which is nearly, as will appear hereafter, in that longitude, with a flag upon it, and a letter at the foot of it, which may convey to him some useful information. It is possible, however, that he might keep outside of the range of islands which skirt this part of the coast.

CHAPTER XI.

Journey across the barren Grounds—Difficulty and delay in crossing Copper-Mine River—Melancholy and fatal Results thereof—Extreme Misery of the whole Party—Murder of Mr. Hood—Death of several of the Canadians—Desolate State of Fort Enterprise—Distress suffered at that Place—Dr. Richardson's Narrative—Mr. Back's Narrative—Conclusion.

1821. August 17. MY original intention, whenever the season should compel us to relinquish the survey, had been to return by the way of the Copper-Mine River, and in pursuance of my arrangement with the Hook to travel to Slave Lake through the line of woods extending thither by the Great Bear and Marten Lakes, but our scanty stock of provision and the length of the voyage rendered it necessary to make for a nearer place. We had already found that the country, between Cape Barrow and the Copper-Mine River, would not supply our wants, and this it seemed probable would now be still more the case; besides, at this advanced season, we expected the frequent recurrence of gales, which would cause great detention, if not danger in proceeding along that very rocky part of the coast.

I determined, therefore, to make at once for Arctic Sound, where we had found the animals more numerous than at any other place; and entering Hood's River, to advance up that stream as far as it was navigable, and then to construct small canoes out of the materials of the larger ones, which could be carried in crossing the barren grounds to Fort Enterprise.

August 19.—We were almost beaten out of our comfortless abodes by rain during the night, and this morning the gale continued

without diminution. The thermometer fell to 33°. Two men were sent with Junius to search for the deer which Augustus had killed. Junius returned in the evening bringing part of the meat, but owing to the thickness of the weather, his companions parted from him and did not make their appearance. Divine service was read. On the 20th we were presented with the most chilling prospect, the small pools of water being frozen over, the ground being covered with snow, and the thermometer at the freezing point at mid-day. Flights of geese were passing to the southward. The wind however was more moderate, having changed to the eastward. Considerable anxiety prevailing respecting Belanger and Michel, the two men who strayed from Junius yesterday, the rest were sent out to look for them. The search was successful, and they all returned in the evening. The stragglers were much fatigued, and had suffered severely from the cold, one of them having his thighs frozen, and what under our present circumstances was most grievous, they had thrown away all the meat. The wind during the night returned to the north-west quarter, blew more violently than ever, and raised a very turbulent sea. The next day did not improve our condition, the snow remained on the ground, and the small pools were frozen. Our hunters were sent out, but they returned after a fatiguing day's march without having seen any animals. We made a scanty meal off a handful of pemmican, after which only half a bag remained.

The wind abated after midnight, and the surf diminished rapidly, which caused us to be on the alert at a very early hour on the 22d, but we had to wait until six A.M. for the return of Augustus who had continued out all night on an unsuccessful pursuit of deer. It appears that he had walked a few miles farther along the coast, than the party had done on the 18th, and from a sketch he drew on the sand, we were confirmed in our former opinion that the shore inclined more to the eastward beyond Point Turnagain. He also

drew a river of considerable size, that discharges its waters into Walker's Bay; on the banks of which stream he saw a piece of wood, such as the Esquimaux use in producing fire, and other marks so fresh that he supposed they had recently visited the spot. We therefore left several iron materials for them. Our men, cheered by the prospect of returning, embarked with the utmost alacrity; and, paddling with unusual vigour, carried us across Riley's and Walker's Bays, a distance of twenty miles before noon, when we landed on Slate-Clay Point, as the wind had freshened too much to permit us to continue the voyage. The whole party went to hunt, but returned without success in the evening, drenched with the heavy rain which commenced soon after they had set out. Several deer were seen, but could not be approached in this naked country; and as our stock of pemmican did not admit of serving out two meals, we went dinnerless to bed.

Soon after our departure to-day, a sealed tin-case, sufficiently buoyant to float, was thrown overboard, containing a short account of our proceedings, and the position of the most conspicuous points. The wind blew off the land, the water was smooth, and as the sea is in this part more free from islands than in any other, there was every probability of its being driven off the shore into the current; which, as I have before mentioned, we suppose, from the circumstance of Mackenzie's River being the only known stream that brings down the wood we have found along the shores, to set to the eastward.

August 23.—A severe frost caused us to pass a comfortless night. At two P.M. we set sail, and the men voluntarily launched out to make a traverse of fifteen miles across Melville Sound, before a strong wind and heavy sea. The privation of food, under which our voyagers were then labouring, absorbed every other terror; otherwise the most powerful persuasion could not have induced them to attempt such a traverse. It was with the utmost difficulty

that the canoes were kept from turning their broadsides to the waves, though we sometimes steered with all the paddles. One of them narrowly escaped being overset by this accident, happening in mid-channel, where the waves were so high that the mast-head of our canoe was often hid from the other, though it was sailing within hail. The annexed plate, from Mr. Back's sketch, will convey to the reader an accurate idea of the peril of our situation.

The traverse, however, was made; we were then near a high rocky lee shore, on which a heavy surf was beating. The wind being on the beam, the canoes drifted fast to leeward; and, on rounding a point, the recoil of the sea from the rocks was so great that they were with difficulty kept from foundering. We looked in vain for a sheltered bay to land in; but, at length, being unable to weather another point, we were obliged to put ashore on the open beach, which, fortunately, was sandy at this spot. The debarkation was effected in the manner represented in the plate; and, fortunately, without further injury than the splitting of the head of the second canoe, which was easily repaired.

Our encampment being near to the place where we killed the deer on the 11th, almost the whole party went out to hunt, but they returned in the evening without having seen any game. The berries, however, were ripe and plentiful, and, with the addition of some country tea, furnished a supper. There were some showers in the afternoon, and the weather was cold, the thermometer being 42°, but the evening and night were calm and fine. It may be remarked that the musquitoes disappeared when the late gales commenced.

August 25.—Embarking at three A.M., we stretched across the eastern entrance of Bathurst's Inlet, and arrived at an island, which I have named after Colonel Barry, of Newton Barry. Some deer being seen on the beach, the hunters went in pursuit of them, and succeeded in killing three females, which enabled us to

Drawn by Lieut Back R.N. Engraved by Edwd. Finden.

CANOE BROACHING TO, IN A GALE OF WIND AT SUNRISE.

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Engraved by Edwd Finden.

EXPEDITION LANDING IN A STORM,

save our last remaining meal of pemmican. They saw also some fresh tracks of musk oxen on the banks of a small stream, which flowed into a lake in the centre of the island. These animals must have crossed a channel, at least, three miles wide, to reach the nearest of these islands. Some specimens of variegated pebbles and jasper were found here imbedded in the amygdaloidal rock.

Re-embarking at two P.M., and continuing through what was supposed to be a channel between two islands, we found our passage barred by a gravelly isthmus of only ten yards in width; the canoes and cargoes were carried across it, and we passed into Bathurst's Inlet through another similar channel, bounded on both sides by steep rocky hills. The wind then changing from S.E. to N.W. brought heavy rain, and we encamped at seven P.M., having advanced eighteen miles.

August 25.—Starting this morning with a fresh breeze in our favour, we soon reached that part of Barry's Island where the canoes were detained on the 2d and 3rd of this month, and contrary to what we then experienced, the deer were now plentiful. The hunters killed two, and we were relieved from all apprehension of an immediate want of food. One would suppose the deer were about to retire to the main shore from their assembling at this time in such numbers on the islands nearest to the coast. Those we saw were generally females with their young, and all of them very lean.

The wind continued in the same direction until we had rounded Point Wollaston, and then changed to a quarter, which enabled us to steer for Hood's River, which we ascended as high as the first rapid and encamped. Here terminated our voyage on the Arctic sea, during which we had gone over six hundred and fifty geographical miles. Our Canadian voyagers could not restrain their expressions of joy at having turned their backs on the sea, and they passed the evening talking over their past adventures with much humour and no little exaggeration. The consideration that

the most painful, and certainly the most hazardous, part of the journey was yet to come, did not depress their spirits at all. It is due to their character to mention that they displayed much courage in encountering the dangers of the sea, magnified to them by their novelty.

The shores between Cape Barrow and Cape Flinders, including the extensive branches of Arctic and Melville Sounds, and Bathurst's Inlet, may be comprehended in one great gulf, which I have distinguished by the appellation of George IV.'s Coronation Gulf, in honour of His Most Gracious Majesty, the latter name being added to mark the time of its discovery. The Archipelago of islands which fringe the coast from Copper-Mine River to Point Turnagain, I have named in honour of His Royal Highness the Duke of York.

It may be deserving of notice that the extremes in temperature of the sea water during our voyage were 53° and 35°, but its general temperature was between 43° and 48°. Throughout our return from Point Turnagain we observed that the sea had risen several feet above marks left at our former encampments. This may, perhaps, be attributed to the north-west gales.

August 26.—Previous to our departure this morning, an assortment of iron materials, beads, looking-glasses, and other articles were put up in a conspicuous situation for the Esquimaux, and the English Union was planted on the loftiest sand-hill, where it might be seen by any ships passing in the offing. Here also, was deposited in a tin box, a letter containing an outline of our proceedings, the latitude and longitude of the principal places, and the course we intended to pursue towards Slave Lake.

Embarking at eight A.M. we proceeded up the river, which is full of sandy shoals, but sufficiently deep for canoes in the channels. It is from one hundred to two hundred yards wide, and is bounded by high and steep banks of clay. We encamped at a cascade of eighteen or twenty feet high, which is produced by a ridge of rock crossing the

THE FALLS OF [illegible],

river, and the nets were set. A mile below this cascade Hood's River is joined by a stream half its own size, which I have called James' Branch. Bear and deer tracks had been numerous on the banks of the river when we were here before, but not a single recent one was to be seen at this time. Crédit, however, killed a small deer at some distance inland, which, with the addition of berries, furnished a delightful repast this evening. The weather was remarkably fine, and the temperature so mild, that the musquitoes again made their appearance, but not in any great numbers. Our distance made to-day was not more than six miles.

The next morning the net furnished us with ten white fish and trout. Having made a further deposit of iron work for the Esquimaux we pursued our voyage up the river, but the shoals and rapids in this part were so frequent, that we walked along the banks the whole day, and the crews laboured hard in carrying the canoes thus lightened over the shoals or dragging them up the rapids, yet our journey in a direct line was only about seven miles. In the evening we encamped at the lower end of a narrow chasm through which the river flows for upwards of a mile. The walls of this chasm are upwards of two hundred feet high, quite perpendicular, and in some places only a few yards apart. The river precipitates itself into it over a rock, forming two magnificent and picturesque falls close to each other. The upper fall is about sixty feet high, and the lower one at least one hundred, but perhaps considerably more, for the narrowness of the chasm into which it fell prevented us from seeing its bottom, and we could merely discern the top of the spray far beneath our feet. The lower fall is divided into two, by an insulated column of rock which rises about forty feet above it. The whole descent of the river at this place probably exceeds two hundred and fifty feet. The rock is very fine felspathose sandstone. It has a smooth surface and a light red colour. I have named these magnificent cascades " Wilberforce Falls," as a tribute of my respect

for that distinguished philanthropist and christian. Messrs. Back and Hood took beautiful sketches of this majestic scene, which are combined in the annexed plate.

The river being surveyed from the summit of a hill, above these falls, appeared so rapid and shallow, that it seemed useless to attempt proceeding any farther in the large canoes. I therefore determined on constructing out of their materials two smaller ones of sufficient size to contain three persons, for the purpose of crossing any river that might obstruct our progress. This operation was accordingly commenced, and by the 31st both the canoes being finished, we prepared for our departure on the following day.

The leather which had been preserved for making shoes was equally divided among the men, two pairs of flannel socks were given to each person, and such articles of warm clothing as remained, were issued to those who most required them. They were also furnished with one of the officers' tents. This being done, I communicated to the men my intention of proceeding in as direct a course as possible to the part of Point Lake, opposite to our spring encampment, which was only distant one hundred and forty-nine miles in a straight line. They received the communication cheerfully, considered the journey to be short, and left me, in high spirits, to arrange their own packages. The stores, books, &c., which were not absolutely necessary to be carried, were then put up in boxes to be left *en cache* here, in order that the men's burdens might be as light as possible.

The next morning was warm, and very fine. Every one was on the alert at an early hour, being anxious to commence the journey. Our luggage consisted of ammunition, nets, hatchets, ice chisels, astronomical instruments, clothing, blankets, three kettles, and the two canoes, which were each carried by one man. The officers carried such a portion of their own things as their strength would permit; the weight carried by each man was about ninety

pounds, and with this we advanced at the rate of about a mile an hour, including rests. In the evening the hunters killed a lean cow, out of a large drove of musk-oxen; but the men were too much laden to carry more than a small portion of its flesh. The alluvial soil, which towards the mouth of the river spreads into plains, covered with grass and willows, was now giving place to a more barren and hilly country; so that we could but just collect sufficient brush wood to cook our suppers. The part of the river we skirted to-day was shallow, and flowed over a bed of sand; its width about one hundred and twenty yards. About midnight our tent was blown down by a squall, and we were completely drenched with rain before it could be re-pitched.

In the morning of the 1st of September a fall of snow took place; the canoes became a cause of delay, by the difficulty of carrying them in a high wind, and they sustained much damage from the falls of those who had charge of them. The face of the country was broken by hills of moderate elevation, but the ground was plentifully strewed with small stones, which, to men bearing heavy burthens, and whose feet were protected only by soft moose skin shoes, occasioned great pain. At the end of eleven miles we encamped, and sent for a musk-ox and a deer, which St. Germain and Augustus had killed. The day was extremely cold, the thermometer varying between 34° and 36°. In the afternoon a heavy fall of snow took place, on the wind changing from north-west to south-west. We found no wood at the encampment, but made a fire of moss to cook the supper, and crept under our blankets for warmth. At sun-rise the thermometer was at 31°, and the wind fresh from north-west; but the weather became mild in the course of the forenoon, and the snow disappeared from the gravel. The afternoon was remarkably fine, and the thermometer rose to 50°. One of the hunters killed a musk-ox. The hills in this part are

lower and more round-backed than those we passed yesterday, and exhibited but little naked rock; they were covered with lichens.

Having ascertained from the summit of the highest hill near the tents, that the river continued to preserve a west course; and fearing that by pursuing it further we might lose much time, and unnecessarily walk over a great deal of ground, I determined on quitting its banks the next day, and making as directly as we could for Point Lake. We accordingly followed the river on the 3d, only to the place where the musk-ox had been killed last evening, and after the meat was procured, crossed the river in our two canoes lashed together. We now emerged from the valley of the river, and entered a level, but very barren, country, varied only by small lakes and marshes, the ground being covered with small stones. Many old tracks of rein-deer were seen in the clayey soil, and some more recent ones of the musk-ox. We encamped on the borders of Wright's River, which flows to the eastward; the direct distance walked to-day being ten miles and three-quarters. The next morning was very fine, and, as the day advanced, the weather became quite warm. We set out at six A.M., and, having forded the river, walked over a perfectly level country, interspersed with small lakes, which communicated with each other, by streams running in various directions. No berry-bearing plants were found in this part, the surface of the earth being thinly covered in the moister places with a few grasses, and on the drier spots with lichens.

Having walked twelve miles and a half, we encamped at seven P.M., and distributed our last piece of pemmican, and a little arrow-root for supper, which afforded but a scanty meal. This evening was warm, but dark clouds overspread the sky. Our men now began to find their burdens very oppressive, and were much fatigued by this day's march, but did not complain. One of them was lame from an inflammation in the knee. Heavy rain commenced at midnight, and

continued without intermission until five in the morning, when it was succeeded by snow on the wind changing to north-west, which soon increased to a violent gale. As we had nothing to eat, and were destitute of the means of making a fire, we remained in our beds all the day; but the covering of our blankets was insufficient to prevent us from feeling the severity of the frost, and suffering inconvenience from the drifting of the snow into our tents. There was no abatement of the storm next day; our tents were completely frozen, and the snow had drifted around them to a depth of three feet, and even in the inside there was a covering of several inches on our blankets. Our suffering from cold, in a comfortless canvass tent in such weather, with the temperature at 20°, and without fire, will easily be imagined; it was, however, less than that which we felt from hunger.

The morning of the 7th cleared up a little, but the wind was still strong, and the weather extremely cold. From the unusual continuance of the storm, we feared the winter had set in with all its rigour, and that by longer delay we should only be exposed to an accumulation of difficulties; we therefore prepared for our journey, although we were in a very unfit condition for starting, being weak from fasting, and our garments stiffened by the frost. We had no means of making a fire to thaw them, the moss, at all times difficult to kindle, being now covered with ice and snow. A considerable time was consumed in packing up the frozen tents and bed clothes, the wind blowing so strong that no one could keep his hands long out of his mittens.

Just as we were about to commence our march, I was seized with a fainting fit, in consequence of exhaustion and sudden exposure to the wind; but after eating a morsel of portable soup, I recovered, so far as to be able to move on. I was unwilling at first to take this morsel of soup, which was diminishing the small and only remaining meal for the party; but several of the men urged me to it, with

much kindness. The ground was covered a foot deep with snow, the margin of the lakes was incrusted with ice, and the swamps over which we had to pass were entirely frozen; but the ice not being sufficiently strong to bear us, we frequently plunged knee-deep in water. Those who carried the canoes were repeatedly blown down by the violence of the wind, and they often fell, from making an insecure step on a slippery stone; on one of these occasions, the largest canoe was so much broken as to be rendered utterly unserviceable. This was felt as a serious disaster, as the remaining canoe having through mistake been made too small, it was doubtful whether it would be sufficient to carry us across a river. Indeed we had found it necessary in crossing Hood's River, to lash the two canoes together. As there was some suspicion that Benoit, who carried the canoe, had broken it intentionally, he having on a former occasion been overheard by some of the men to say, that he would do so when he got it in charge, we closely examined him on the point; he roundly denied having used the expressions attributed to him, and insisted that it was broken by his falling accidentally; and as he brought men to attest the latter fact, who saw him tumble, we did not press the matter further. I may here remark that our people had murmured a good deal at having to carry two canoes, though they were informed of the necessity of taking both, in case it should be deemed advisable to divide the party; which it had been thought probable we should be obliged to do, if animals proved scarce, in order to give the whole the better chance of procuring subsistence, and also for the purpose of sending forward some of the best walkers to search for Indians, and to get them to meet us with supplies of provision. The power of doing this was now at an end. As the accident could not be remedied, we turned it to the best account, by making a fire of the bark and timbers of the broken vessel, and cooked the remainder of our portable soup and arrow-root. This was a scanty meal after three days' fasting, but it served

to allay the pangs of hunger, and enabled us to proceed at a quicker pace than before. The depth of the snow caused us to march in Indian file, that is in each other's steps; the voyagers taking it in turn to lead the party. A distant object was pointed out to this man in the direction we wished to take, and Mr. Hood followed immediately behind him, to renew the bearings, and keep him from deviating more than could be helped from the mark. It may be here observed, that we proceeded in this manner throughout our route across the barren grounds.

In the afternoon we got into a more hilly country, where the ground was strewed with large stones. The surface of these was covered with lichens of the *genus gyrophora*, which the Canadians term *tripe de roche*. A considerable quantity was gathered, and with half a partridge each, (which were shot in the course of the day,) furnished us with a slender supper, which we cooked with a few willows, dug up from beneath the snow. We passed a comfortless night in our damp clothes, but took the precaution of sleeping upon our socks and shoes to prevent them from freezing. This plan was afterwards adopted throughout the journey.

At half past five in the morning we proceeded; and after walking about two miles, came to Cracroft's River, flowing to the westward, with a very rapid current over a rocky channel. We had much difficulty in crossing this, the canoe being useless, not only from the bottom of the channel being obstructed by large stones, but also from its requiring gumming, an operation which, owing to the want of wood and the frost, we were unable to perform. However, after following the course of the river some way, we effected a passage by means of a range of large rocks that crossed a rapid. As the current was strong, and many of the rocks were covered with water to the depth of two or three feet, the men were exposed to much danger in carrying their heavy burthens across, and several of them actually slipped into the stream, but were immediately rescued by the others. Junius went

farther up the river in search of a better crossing place, and did not rejoin us to-day. As several of the party were drenched from head to foot, and we were all wet to the middle, our clothes became stiff with the frost, and we walked with much pain for the remainder of the day. The march was continued to a late hour, being anxious to rejoin the hunters who had gone before, but we were obliged to encamp at the end of ten miles and a quarter, without seeing them. Our only meal to-day consisted of a partridge each, (which the hunters shot,) mixed with *tripe de roche.* This repast although scanty for men, with appetites such as our daily fatigue created, proved a cheerful one, and was received with thankfulness. Most of the men had to sleep in the open air, in consequence of the absence of Crédit, who carried their tent; but we fortunately found an unusual quantity of roots to make a fire, which prevented their suffering much from the cold, though the thermometer was at 17°.

We started at six on the 9th, and at the end of two miles regained our hunters, who were halting on the borders of a lake amidst a clump of stunted willows. This lake stretched to the westward as far as we could see, and its waters were discharged by a rapid stream one hundred and fifty yards wide. Being entirely ignorant where we might be led by pursuing the course of the lake, and dreading the idea of going a mile unnecessarily out of the way, we determined on crossing the river if possible; and the canoe was gummed for the purpose, the willows furnishing us with fire. But we had to await the return of Junius before we could make the traverse. In the mean time we gathered a little *tripe de roche,* and breakfasted upon it and a few partridges that were killed in the morning. St. Germain and Adam were sent upon some recent tracks of deer. Junius arrived in the afternoon, and informed us that he had seen a large herd of musk-oxen on the banks of Cracroft's River, and had wounded one of them, but it had escaped. He brought about four pounds of meat, the remains of a deer that had been devoured by

the wolves. The poor fellow was much fatigued, having walked throughout the night, but as the weather was particularly favourable for our crossing the river, we could not allow him to rest. After he had taken some refreshment we proceeded to the river. The canoe being put into the water was found extremely ticklish, but it was managed with much dexterity by St. Germain, Adam, and Peltier, who ferried over one passenger at a time, causing him to lie flat in its bottom, by no means a pleasant position, owing to its leakiness, but there was no alternative. The transport of the whole party was effected by five o'clock, and we walked about two miles further, and encamped, having come five miles and three quarters on a south-west course. Two young alpine hares were shot by St. Germain, which, with the small piece of meat brought in by Junius, furnished the supper of the whole party. There was no *tripe de roche* here. The country had now become decidedly hilly, and was covered with snow. The lake preserved its western direction, as far as I could see from the summit of the highest mountain near the encampment. We subsequently learned from the Copper Indians, that the part at which we had crossed the river was the *Congecatha wha chaga* of Hearne, of which I had little idea at the time, not only from the difference of latitude, but also from its being so much farther east of the mouth of the Copper-Mine River, than his track is laid down. He only making one degree and three quarters' difference of longitude, and we, upwards of four. Had I been aware of the fact, several days' harassing march, and a disastrous accident would have been prevented by keeping on the western side of the lake, instead of crossing the river. We were informed also, that this river is the Anatessy or River of Strangers, and is supposed to fall into Bathurst's Inlet; but although the Indians have visited its mouth, their description was not sufficient to identify it with any of the rivers whose mouths we had seen. It probably falls in that part of

the coast which was hid from our view by Goulburn's or Elliot's Islands.

September 10.—We had a cold north wind, and the atmosphere was foggy. The thermometer 18° at five A.M. In the course of our march this morning, we passed many small lakes; and the ground, becoming higher and more hilly as we receded from the river, was covered to a much greater depth with snow. This rendered walking not only extremely laborious, but also hazardous in the highest degree; for the sides of the hills, as is usual throughout the barren grounds, abounding in accumulations of large angular stones, it often happened that the men fell into the interstices with their loads on their backs, being deceived by the smooth appearance of the drifted snow. If any one had broken a limb here, his fate would have been melancholy indeed; we could neither have remained with him, nor carried him on. We halted at ten to gather *tripe de roche*, but it was so frozen, that we were quite benumbed with cold before a sufficiency could be collected even for a scanty meal. On proceeding our men were somewhat cheered, by observing on the sandy summit of a hill, from whence the snow had been blown, the summer track of a man; and afterwards by seeing several deer tracks on the snow. About noon the weather cleared up a little, and, to our great joy, we saw a herd of musk-oxen grazing in a valley below us. The party instantly halted, and the best hunters were sent out; they approached the animals with the utmost caution, no less than two hours being consumed before they got within gun-shot. In the mean time we beheld their proceedings with extreme anxiety, and many secret prayers were, doubtless, offered up for their success. At length they opened their fire, and we had the satisfaction of seeing one of the largest cows fall; another was wounded, but escaped. This success infused spirit into our starving party. To skin and cut up the animal was the work of a

few minutes. The contents of its stomach were devoured upon the spot, and the raw intestines, which were next attacked, were pronounced by the most delicate amongst us to be excellent. A few willows, whose tops were seen peeping through the snow in the bottom of the valley, were quickly grubbed, the tents pitched, and supper cooked, and devoured with avidity. This was the sixth day since we had had a good meal. The *tripe de roche*, even where we got enough, only serving to allay the pangs of hunger for a short time. After supper, two of the hunters went in pursuit of the herd, but could not get near them.

We were detained all the next day by a strong southerly wind, and were much incommoded in the tents by the drift snow. The temperature was 20°. The average for the last ten days about 24°.5. We restricted ourselves to one meal to-day as we were at rest, and there was only meat remaining sufficient for the next day.

The gale had not diminished on the 12th, and, as we were fearful of its continuance for some time, we determined on going forward; our only doubt regarded the preservation of the canoe, but the men promised to pay particular attention to it, and the most careful persons were appointed to take it in charge. The snow was two feet deep, and the ground much broken, which rendered the march extremely painful. The whole party complained more of faintness and weakness than they had ever done before; their strength seemed to have been impaired by the recent supply of animal food. In the afternoon the wind abated, and the snow ceased; cheered with the change we proceeded forward at a quicker pace, and encamped at six P.M., having come eleven miles. Our supper consumed the last of our meat.

We set out on the 13th, in thick hazy weather, and, after an hour's march, had the extreme mortification to find ourselves on the borders of a large lake, which we subsequently learned from the Indians was named Contwoy-to, or Rum Lake; neither of its extre-

mities could be seen, and as the portion which lay to the east seemed the widest, we coasted along to the westward portion in search of a crossing-place. This lake being bounded by steep and lofty hills, our march was very fatiguing. Those sides which were exposed to the sun, were free from snow, and we found upon them some excellent berries. We encamped at six P.M., having come only six miles and a half. Crédit was then missing, and he did not return during the night. We supped off a single partridge and some *tripe de roche*; this unpalatable weed was now quite nauseous to the whole party, and in several it produced bowel complaints. Mr. Hood was the greatest sufferer from this cause. This evening we were extremely distressed, at discovering that our improvident companions, since we left Hood's River, had thrown away three of the fishing-nets, and burnt the floats; they knew we had brought them to procure subsistence for the party, when the animals should fail, and we could scarcely believe the fact of their having wilfully deprived themselves of this resource, especially when we considered that most of them had passed the greater part of their servitude in situations where the nets alone had supplied them with food. Being thus deprived of our principal resource, that of fishing, and the men evidently getting weaker every day, it became necessary to lighten their burthens of every thing except ammunition, clothing, and the instruments that were required to find our way. I, therefore, issued directions to deposit at this encampment the dipping needle, azimuth compass, magnet, a large thermometer, and a few books we had carried, having torn out of these such parts as we should require to work the observations for latitude and longitude. I also promised, as an excitement to the efforts in hunting, my gun to St. Germain, and an ample compensation to Adam, or any of the other men who should kill any animals. Mr. Hood, on this occasion, lent his gun to Michel, the Iroquois, who was very eager in the chase, and often successful.

September 14.—This morning the officers being assembled round a small fire, Perrault presented each of us with a small piece of meat which he had saved from his allowance. It was received with great thankfulness, and such an act of self-denial and kindness, being totally unexpected in a Canadian voyager, filled our eyes with tears. In directing our course to a river issuing from the lake, we met Crédit, who communicated the joyful intelligence of his having killed two deer in the morning. We instantly halted, and having shared the deer that was nearest to us, prepared breakfast. After which, the other deer was sent for, and we went down to the river, which was about three hundred yards wide, and flowed with great velocity through a broken rocky channel. Having searched for a part where the current was most smooth, the canoe was placed in the water at the head of a rapid, and St. Germain, Solomon Belanger, and I, embarked in order to cross. We went from the shore very well, but in mid-channel the canoe became difficult to manage under our burden as the breeze was fresh. The current drove us to the edge of the rapid, when Belanger unfortunately applied his paddle to avert the apparent danger of being forced down it, and lost his balance. The canoe was overset in consequence in the middle of the rapid. We fortunately kept hold of it, until we touched a rock where the water did not reach higher than our waists; here we kept our footing, notwithstanding the strength of the current, until the water was emptied out of the canoe. Belanger then held the canoe steady whilst St. Germain placed me in it, and afterwards embarked himself in a very dexterous manner. It was impossible, however, to embark Belanger, as the canoe would have been hurried down the rapid, the moment he should have raised his foot from the rock on which he stood. We were, therefore, compelled to leave him in his perilous situation. We had not gone twenty yards before the canoe, striking on a sunken rock, went down. The place being shallow, we were again

enabled to empty it, and the third attempt brought us to the shore. In the mean time Belanger was suffering extremely, immersed to his middle in the centre of a rapid, the temperature of which was very little above the freezing point, and the upper part of his body covered with wet clothes, exposed in a temperature not much above zero, to a strong breeze. He called piteously for relief, and St. Germain on his return endeavoured to embark him, but in vain. The canoe was hurried down the rapid, and when he landed he was rendered by the cold incapable of further exertion, and Adam attempted to embark Belanger, but found it impossible. An attempt was next made to carry out to him a line, made of the slings of the men's loads. This also failed, the current acting so strongly upon it, as to prevent the canoe from steering, and it was finally broken and carried down the stream. At length, when Belanger's strength seemed almost exhausted, the canoe reached him with a small cord belonging to one of the nets, and he was dragged perfectly senseless through the rapid. By the direction of Dr. Richardson, he was instantly stripped, and being rolled up in blankets, two men undressed themselves and went to bed with him; but it was some hours before he recovered his warmth and sensations. As soon as Belanger was placed in his bed, the officers immediately sent over my blankets, and a person to make a fire. Augustus brought the canoe over, and in returning he was obliged to descend both the rapids, before he could get across the stream; which hazardous service he performed with the greatest coolness and judgment. It is impossible to describe my sensations as I witnessed the various unsuccessful attempts to relieve Belanger. The distance prevented my seeing distinctly what was going on, and I continued pacing up and down upon the rock on which I landed, regardless of the coldness of my drenched and stiffening garments. The canoe, in every attempt to reach him, was hurried down the rapid, and was lost to the view amongst the rocky islets, with a rapidity that

seemed to threaten certain destruction; once, indeed, I fancied that I saw it overwhelmed in the waves. Such an event would have been fatal to the whole party. Separated as I was from my companions, without gun, ammunition, hatchet, or the means of making a fire, and in wet clothes, my doom would have been speedily sealed. My companions too, driven to the necessity of coasting the lake, must have sunk under the fatigue of rounding its innumerable arms and bays, which, as we have learned from the Indians, are very extensive. By the goodness of Providence, however, we were spared at that time, and some of us have been permitted to offer up our thanksgivings, in a civilized land, for the signal deliverances we then and afterwards experienced.

By this accident I had the misfortune to lose my port-folio, containing my journal from Fort Enterprise, together with all the astronomical and meteorological observations made during the descent of the Copper-Mine River, and along the sea-coast, (except those for the dip and variation.) I was in the habit of carrying it strapped across my shoulders, but had taken it off on entering the canoe, to reduce the upper weight. The results of most of the observations for latitude and longitude, had been registered in the sketch books, so that we preserved the requisites for the construction of the chart. The meteorological observations, not having been copied, were lost. My companions, Dr. Richardson, Mr. Back, and Mr. Hood, had been so careful in noting every occurrence in their journals, that the loss of mine could fortunately be well supplied. These friends immediately offered me their documents, and every assistance in drawing up another narrative, of which kindness I availed myself at the earliest opportunity afterwards.

September 15.—The rest of the party were brought across this morning, and we were delighted to find Belanger so much recovered as to be able to proceed, but we could not set out until noon, as the men had to prepare substitutes for the slings which were lost yesterday.

Soon after leaving the encampment we discerned a herd of deer, and after a long chase a fine male was killed by Perrault, several others were wounded but they escaped. After this we passed round the north end of a branch of the lake, and ascended the Willingham Mountains, keeping near the border of the lake. These hills were steep, craggy, and covered with snow. We encamped at seven and enjoyed a substantial meal. The party were in good spirits this evening at the recollection of having crossed the rapid, and being in possession of provision for the next day. Besides we had taken the precaution of bringing away the skin of the deer to eat when the meat should fail. The temperature at six P.M. was 30°.

We started at seven next morning and marched until ten, when the appearance of a few willows, peeping through the snow, induced us to halt and breakfast. Re-commencing the journey at noon, we passed over a more rugged country, where the hills were separated by deep ravines, whose steep sides were equally difficult to descend and to ascend. The annexed accurate delineation of the country we then travelled over, and of the mode of getting our only food, will convey to the reader a better idea of the toil and suffering we experienced than any description of mine can do.

The party was quite fatigued, and we encamped, having come ten miles and three quarters. We observed many summer deer roads, and some recent tracks. Some marks that had been put up by the Indians were also noticed. We have since learned that this is a regular deer pass, and on that account, annually frequented by the Copper Indians. The lake is called by them Contwoy-to, or Rum Lake; in consequence of Mr. Hearne having here given the Indians who accompanied him some of that liquor. They do not get fish here.

We walked next day over a more level country, but it was strewed with large stones. These galled our feet a good deal; we contrived, however, to wade through the snow at a tolerably quick

Engraved by Edwd Finden

PREPARING AN ENCAMPMENT ON THE BARREN GROUNDS,

Gathering Tripe de Roche for Supper.

pace until five P.M., having made twelve miles and a half. We had made to-day our proper course, south by east, which we could not venture upon doing before, for fear of falling again upon some branch of the Contwoy-to. Some deer were seen in the morning, but the hunters failed of killing any, and in the afternoon we fell into the track of a large herd, which had passed the day before, but did not overtake them. In consequence of this want of success we had no breakfast, and but a scanty supper; but we allayed the pangs of hunger, by eating pieces of singed hide. A little *tripe de roche* was also obtained. These would have satisfied us in ordinary times, but we were now almost exhausted by slender fare and travel, and our appetites had become ravenous. We looked, however, with humble confidence to the great Author and Giver of all good, for a continuance of the support which had hitherto been always supplied to us at our greatest need. The thermometer varied to-day between 25° and 28°. The wind blew fresh from the south.

On the 18th the atmosphere was hazy, but the day was more pleasant for walking than usual. The country was level and gravelly, and the snow very deep. We went for a short time along a deeply-beaten road, made by the rein-deer, which turned suddenly off to the south-west, which was a direction so wide of our course that we could not venture upon following it. All the small lakes were frozen, and we marched across those which lay in our track. We supped off the *tripe de roche* which had been gathered during our halts in the course of the march. Thermometer at six P.M. 32°.

Showers of snow fell without intermission through the night, but they ceased in the morning, and we set out at the usual hour. The men were very faint from hunger, and marched with difficulty, having to oppose a fresh breeze, and to wade through the snow two feet deep. We gained, however, ten miles by four o'clock, and then encamped. The canoe was unfortunately broken by the fall of the person who had it in charge. No *tripe de roche* was seen to-day,

but in clearing the snow to pitch the tents we found a quantity of Iceland moss, which was boiled for supper. This weed, not having been soaked, proved so bitter, that few of the party could eat more than a few spoonfuls of it.

Our blankets did not suffice this evening to keep us in tolerable warmth; the slightest breeze seeming to pierce through our debilitated frames. The reader will, probably, be desirous to know how we passed our time in such a comfortless situation: the first operation after encamping was to thaw our frozen shoes, if a sufficient fire could be made, and dry ones were put on; each person then wrote his notes of the daily occurrences, and evening prayers were read; as soon as supper was prepared it was eaten, generally in the dark, and we went to bed, and kept up a cheerful conversation until our blankets were thawed by the heat of our bodies, and we had gathered sufficient warmth to enable us to fall asleep. On many nights we had not even the luxury of going to bed in dry clothes, for when the fire was insufficient to dry our shoes, we durst not venture to pull them off, lest they should freeze so hard as to be unfit to put on in the morning, and, therefore, inconvenient to carry.

On the 20th we got into a hilly country, and the marching became much more laborious, even the stoutest experienced great difficulty in climbing the craggy eminences. Mr. Hood was particularly weak, and was obliged to relinquish his station of second in the line, which Dr. Richardson now took, to direct the leading man in keeping the appointed course. I was also unable to keep pace with the men, who put forth their utmost speed, encouraged by the hope, which our reckoning had led us to form, of seeing Point Lake in the evening, but we were obliged to encamp without gaining a view of it. We had not seen either deer or their tracks through the day, and this circumstance, joined to the disappointment of not discovering the lake, rendered our voyagers very

desponding, and the meagre supper of *tripe de roche* was little calculated to elevate their spirits. They now threatened to throw away their bundles, and quit us, which rash act they would probably have done, if they had known what track to pursue.

September 21.—We set out at seven this morning in dark foggy weather, and changed our course two points to the westward. The party were very feeble, and the men much dispirited; we made slow progress, having to march over a hilly and very rugged country.

Just before noon the sun beamed through the haze for the first time for six days, and we obtained an observation in latitude 65° 7′ 06″ N., which was six miles to the southward of that part of Point Lake to which our course was directed. By this observation we discovered that we had kept to the eastward of the proper course, which may be attributed partly to the difficulty of preserving a straight line through an unknown country, unassisted by celestial observations, and in such thick weather, that our view was often limited to a few hundred yards; but chiefly to our total ignorance of the amount of the variation of the compass.

We altered the course immediately to west-south-west, and fired guns to apprize the hunters who were out of our view, and ignorant of our having done so. After walking about two miles we put up to collect the stragglers. Two partridges were killed, and these, with some *tripe de roche*, furnished our supper. Notwithstanding a full explanation was given to the men of the reasons for altering the course, and they were assured that the observation had enabled us to discover our exact distance from Fort Enterprise, they could not divest themselves of the idea of our having lost our way, and a gloom was spread over every countenance. At this encampment Dr. Richardson was obliged to deposit his specimens of plants and minerals, collected on the sea-coast, being unable to carry them any farther. The way made to-day was five miles and a quarter.

September 22.—After walking about two miles this morning, we came upon the borders of a large lake, whose extremities could not be discerned in consequence of the density of the atmosphere; but as its shores seemed to approach nearer to each other to the southward than to the northward, we determined on tracing it in that direction. We were grieved at finding the lake expand very much beyond the contracted part we had first seen, and incline now to the eastward of south. As it was considered more than probable, from the direction and size of the body of water we were now tracing, that it was a branch of Point Lake; and as, in any case, we knew that by passing round its south end, we must shortly come to the Copper-Mine River, our course was continued in that direction. The appearance of some dwarf pines and willows, larger than usual, induced us to suppose the river was near. We encamped early, having come eight miles. Our supper consisted of *tripe de roche* and half a partridge each.

Our progress next day was extremely slow, from the difficulty of managing the canoe in passing over the hills, as the breeze was fresh. Peltier, who had it in charge, having received several severe falls, became impatient, and insisted on leaving his burden, as it had already been much injured by the accidents of this day; and no arguments we could use were sufficient to prevail on him to continue carrying it. Vaillant was, therefore, directed to take it, and we proceeded forward. Having found he got on very well, and was walking even faster than Mr. Hood could, in his present debilitated state, I pushed forward to stop the rest of the party, who had got out of our sight during the delay which the discussion about the canoe had occasioned. I accidentally passed the body of the men, and followed the tracks of two persons, who had separated from the rest, until two P.M., when, not seeing any person, I retraced my steps, and on my way met Dr. Richardson, who had also missed the party whilst he was employed gathering *tripe de roche*, and we went

back together in search of them. We found they had halted among some willows, where they had picked up some pieces of skin, and a few bones of deer that had been devoured by the wolves last spring. They had rendered the bones friable by burning, and eaten them, as well as the skin; and several of them had added their old shoes to the repast. Peltier and Vaillant were with them, having left the canoe, which, they said, was so completely broken by another fall, as to be rendered incapable of repair, and entirely useless. The anguish this intelligence occasioned may be conceived, but it is beyond my power to describe it. Impressed, however, with the necessity of taking it forward, even in the state these men represented it to be, we urgently desired them to fetch it; but they declined going, and the strength of the officers was inadequate to the task. To their infatuated obstinacy on this occasion, a great portion of the melancholy circumstances which attended our subsequent progress may, perhaps, be attributed. The men now seemed to have lost all hope of being preserved; and all the arguments we could use failed in stimulating them to the least exertion. After consuming the remains of the bones and horns of the deer we resumed our march, and, in the evening, reached a contracted part of the lake, which perceiving to be shallow, we forded and encamped on the opposite side. Heavy rain began soon afterwards, and continued all the night. On the following morning the rain had so wasted the snow, that the tracks of Mr. Back and his companions, who had gone before with the hunters, were traced with difficulty; and the frequent showers during the day almost obliterated them. The men became furious at the apprehension of being deserted by the hunters, and some of the strongest throwing down their bundles, prepared to set out after them, intending to leave the more weak to follow as they could. The entreaties and threats of the officers, however, prevented their executing this mad scheme: but not before Solomon Belanger was despatched with orders for Mr. Back to halt

until we should join him. Soon afterwards a thick fog came on, but we continued our march and overtook Mr. Back, who had been detained in consequence of his companions having followed some recent tracks of deer. After halting an hour, during which we refreshed ourselves with eating our old shoes and a few scraps of leather, we set forward in the hope of ascertaining whether an adjoining piece of water was the Copper-Mine River or not, but were soon compelled to return and encamp, for fear of a separation of the party, as we could not see each other at ten yards' distance. The fog diminishing towards the evening, Augustus was sent to examine the water, but having lost his way he did not reach the tents before midnight, when he brought the information of its being a lake. We supped upon *tripe de roche* *, and enjoyed a comfortable fire, having found some pines, seven or eight feet high, in a valley near the encampment.

The bounty of Providence was most seasonably manifested to us next morning, in our killing five small deer out of a herd, which came in sight as we were on the point of starting. This unexpected supply reanimated the drooping spirits of our men, and filled every heart with gratitude.

The voyagers instantly petitioned for a days' rest, which we were most reluctant to grant, being aware of the importance of every moment at this critical period of our journey. But they so earnestly and strongly pleaded their recent sufferings, and their conviction, that the quiet enjoyment of two substantial meals, after eight days' famine, would enable them to proceed next day more vigorously, that we could not resist their entreaties. The flesh, the skins, and even the contents of the stomachs of the deer were equally distributed among the party by Mr. Hood, who had volun-

* The different kinds of gyrophora, termed indiscriminately by the voyagers *tripe de roche*, are represented in Plate 30.

teered, on the departure of Mr. Wentzel, to perform the duty of issuing the provision. This invidious task he had all along performed with great impartiality, but seldom without producing some grumbling amongst the Canadians; and, on the present occasion, the hunters were displeased that the heads, and some other parts, had not been added to their portions. It is proper to remark, that Mr. Hood always took the smallest portion for his own mess, but this weighed little with these men, as long as their own appetites remained unsatisfied. We all suffered much inconvenience from eating animal food after our long abstinence, but particularly those men who indulged themselves beyond moderation. We learned, in the evening that the Canadians, with their usual thoughtlessness, had consumed above a third of their portions of meat.

We set out early on the 26th, and, after walking about three miles along the lake, came to the river, which we at once recognised, from its size, to be the Copper-Mine. It flowed to the northward, and after winding about five miles, terminated in Point Lake. Its current was swift, and there were two rapids in this part of its course, but in a canoe we could have crossed with ease and safety. These rapids, as well as every other part of the river, were carefully examined in search of a ford; but finding none, the expedients occurred, of attempting to cross on a raft made of the willows which were growing there, or in a vessel framed with willows, and covered with the canvass of the tents; but both these schemes were abandoned, through the obstinacy of the interpreters and the most experienced voyagers, who declared that they would prove inadequate to the conveyance of the party, and that much time would be lost in the attempt. The men, in fact, did not believe that this was the Copper-Mine River, and so little confidence had they in our reckoning, and so much had they bewildered themselves on the march, that some of them asserted it was Hood's River, and others that it was the Bethe-tessy, (a river which rises from a lake to the

northward of Rum Lake, and holds a course to the sea parallel to the Copper-Mine.) In short, their despondency had returned, and they all despaired of seeing Fort Enterprise again. However, the steady assurances of the officers, that we were actually on the banks of the Copper-Mine River, and that the distance to Fort Enterprise did not exceed forty miles, made some impression upon them, which was increased upon our finding some bear-berry plants, (*arbutus uva ursi*), which is reported by the Indians not to grow to the eastward of that river. Then they deplored their folly and impatience in breaking the canoe, being all of opinion, that had it not been so completely demolished on the 23d, it might have been repaired sufficiently to take the party over. We again closely interrogated Peltier and Vaillant as to its state, with the intention of sending for it; but they persisted in the declaration, that it was in a totally unserviceable condition. St. Germain being again called upon, to endeavour to construct a canoe frame with willows, stated that he was unable to make one sufficiently large. It became necessary, therefore, to search for pines of sufficient size to form a raft; and being aware that such trees grow on the borders of Point Lake, we considered it best to trace its shores in search of them; we, therefore, resumed our march, carefully looking, but in vain, for a fordable part, and encamped at the east end of Point Lake.

As there was little danger of our losing the path of our hunters whilst we coasted the shores of this lake, I determined on again sending Mr. Back forward, with the interpreters, to hunt. I had in view, in this arrangement, the further object of enabling Mr. Back to get across the lake with two of these men, to convey the earliest possible account of our situation to the Indians. Accordingly I instructed him to halt at the first pines he should come to, and then prepare a raft; and if his hunters had killed animals, so that the party could be supported whilst we were making our raft, he was to cross immediately with St. Germain and Beauparlant, and send the Indians to us as quickly as possible with supplies of meat.

We had this evening the pain of discovering that two of our men had stolen part of the officers' provision, which had been allotted to us with strict impartiality. This conduct was the more reprehensible, as it was plain that we were suffering, even in a greater degree than themselves, from the effects of famine, owing to our being of a less robust habit, and less accustomed to privations. We had no means of punishing this crime, but by the threat that they should forfeit their wages, which had now ceased to operate.

Mr. Back and his companions set out at six in the morning, and we started at seven. As the snow had entirely disappeared, and there were no means of distinguishing the footsteps of stragglers, I gave strict orders, previously to our setting out, for all the party to keep together: and especially I desired the two Esquimaux not to leave us, they having often strayed in search of the remains of animals. Our people, however, through despondency, had become careless and disobedient, and had ceased to dread punishment, or hope for reward. Much time was lost in halting and firing guns to collect them, but the labour of walking was so much lightened by the disappearance of the snow, that we advanced seven or eight miles along the lake before noon, exclusive of the loss of distance in rounding its numerous bays. At length we came to an arm, running away to the north-east, and apparently connected with the lake which we had coasted on the 22d, 23d, and 24th, of the month.

The idea of again rounding such an extensive piece of water and of travelling over so barren a country was dreadful, and we feared that other arms, equally large, might obstruct our path, and that the strength of the party would entirely fail, long before we could reach the only part where we were certain of finding wood, distant in a direct line twenty-five miles. While we halted to consider of this subject, and to collect the party, the carcase of a deer was discovered in the cleft of a rock into which it had fallen in the

spring. It was putrid, but it was little less acceptable to us on that account, in our present circumstances; and a fire being kindled, a large portion of it was devoured on the spot, affording us an unexpected breakfast, for in order to husband our small remaining portion of meat, we had agreed to make only one scanty meal a day. The men, cheered by this unlooked-for supply, became sanguine in the hope of being able to cross the stream on a raft of willows, although they had before declared such a project impracticable, and they unanimously entreated us to return back to the rapid, a request which accorded with our own opinion, and was therefore acceded to. Crédit and Junius, however, were missing, and it was also necessary to send notice of our intention to Mr. Back and his party. Augustus being promised a reward, undertook the task, and we agreed to wait for him at the rapid. It was supposed he could not fail meeting with the two stragglers on his way to or from Mr. Back, as it was likely they would keep on the borders of the lake. He accordingly set out after Mr. Back, whilst we returned about a mile towards the rapid, and encamped in a deep valley amongst some large willows. We supped on the remains of the putrid deer, and the men having gone to the spot where it was found, scraped together the contents of its intestines which were scattered on the rock, and added them to their meal. We also enjoyed the luxury to-day of eating a large quantity of excellent blue-berries and cran-berries, (*vaccinium uliginosum* and *v. vitis idæa,*) which were laid bare by the melting of the snow, but nothing could allay our inordinate appetites.

In the night we heard the report of Crédit's gun in answer to our signal muskets, and he rejoined us in the morning, but we got no intelligence of Junius. We set out about an hour after daybreak, and encamped at two P.M. between the rapids, where the river was about one hundred and thirty yards wide, being its narrowest part.

Eight deer were seen by Michel and Crédit, who loitered behind

the rest of the party, but they could not approach them. A great many shots were fired by those in the rear at partridges, but they missed, or at least did not choose to add what they killed to the common stock. We subsequently learned that the hunters often secreted the partridges they shot, and ate them unknown to the officers. Some *tripe de roche* was collected, which we boiled for supper, with the moiety of the remainder of our deer's meat. The men commenced cutting the willows for the construction of the raft. As an excitement to exertion, I promised a reward of three hundred livres to the first person who should convey a line across the river, by which the raft could be managed in transporting the party.

September 29.—Strong south-east winds with fog in the morning, more moderate in the evening. Temperature of the rapid 38°. The men began at an early hour to bind the willows in fagots for the construction of the raft, and it was finished by seven; but as the willows were green, it proved to be very little buoyant, and was unable to support more than one man at a time. Even on this, however, we hoped the whole party might be transported, by hauling it from one side to the other, provided a line could be carried to the other bank. Several attempts were made by Belanger and Benoit, the strongest men of the party, to convey the raft across the stream, but they failed for want of oars. A pole constructed by tying the tent poles together, was too short to reach the bottom at a short distance from the shore; and a paddle which had been carried from the sea coast by Dr. Richardson, did not possess sufficient power to move the raft in opposition to a strong breeze, which blew from the opposite shore. All the men suffered extremely from the coldness of the water, in which they were necessarily immersed up to the waists, in their endeavours to aid Belanger and Benoit; and having witnessed repeated failures, they began to consider the scheme as hopeless. At this time Dr. Richardson, prompted by a desire of relieving his suffering companions, proposed

to swim across the stream with a line, and to haul the raft over. He launched into the stream with the line round his middle, but when he had got a short distance from the bank, his arms became benumbed with cold, and he lost the power of moving them; still he persevered, and turning on his back, had nearly gained the opposite bank, when his legs also became powerless, and to our infinite alarm we beheld him sink. We instantly hauled upon the line and he came again on the surface, and was gradually drawn ashore in an almost lifeless state. Being rolled up in blankets, he was placed before a good fire of willows, and fortunately was just able to speak sufficiently to give some slight directions respecting the manner of treating him. He recovered strength gradually, and by the blessing of God was enabled in the course of a few hours to converse, and by the evening was sufficiently recovered to remove into the tent. We then regretted to learn, that the skin of his whole left side was deprived of feeling in consequence of exposure to too great heat. He did not perfectly recover the sensation of that side until the following summer. I cannot describe what every one felt at beholding the skeleton which the Doctor's debilitated frame exhibited. When he stripped, the Canadians simultaneously exclaimed, "Ah que nous sommes maigres." I shall best explain his state and that of the party, by the following extract from his journal: "It may be worthy of remark that I would have had little hesitation in any former period of my life, of plunging into water even below 38° Fahrenheit; but at this time I was reduced almost to skin and bone, and like the rest of the party, suffered from degrees of cold that would have been disregarded whilst in health and vigour. During the whole of our march we experienced that no quantity of clothing could keep us warm whilst we fasted, but on those occasions on which we were enabled to go to bed with full stomachs, we passed the night in a warm and comfortable manner."

In following the detail of our friend's narrow escape, I have

omitted to mention, that when he was about to step into the water, he put his foot on a dagger, which cut him to the bone; but this misfortune could not stop him from attempting the execution of his generous undertaking.

In the evening Augustus came in. He had walked a day and a half beyond the place from whence we turned back, but had neither seen Junius nor Mr. Back. Of the former he had seen no traces, but he had followed the tracks of Mr. Back's party for a considerable distance, until the hardness of the ground rendered them imperceptible. Junius was well equipped with ammunition, blankets, knives, a kettle and other necessaries; and it was the opinion of Augustus, that when he found he could not rejoin the party, he would endeavour to gain the woods on the west end of Point Lake, and follow the river until he fell in with the Esquimaux, who frequent its mouth. The Indians too, with whom we have since conversed upon this subject, are confident that he would be able to subsist himself during the winter. Crédit, on his hunting excursion to-day, found a cap, which our people recognised to belong to one of the hunters who had left us in the spring. This circumstance produced the conviction of our being on the banks of the Copper-Mine River, which all the assertions of the officers had hitherto failed to do with some of the party; and it had the happy effect of reviving their spirits considerably. We consumed the last of our deer's meat this evening at supper.

Next morning the men went out in search of dry willows, and collected eight large fagots, with which they formed a more buoyant raft than the former, but the wind being still adverse and strong, they delayed attempting to cross until a more favourable opportunity. Pleased, however, with the appearance of this raft, they collected some *tripe de roche*, and made a cheerful supper. Dr. Richardson was gaining strength, but his leg was much swelled and very painful. An observation for latitude placed the encampment

in 65° 00′ 00″ N., the longitude being 112° 20′ 00″ W., deduced from the last observation.

On the morning of the 1st of October, the wind was strong, and the weather as unfavourable as before for crossing on the raft. We were rejoiced to see Mr. Back and his party in the afternoon. They had traced the lake about fifteen miles farther than we did, and found it undoubtedly connected, as we had supposed, with the lake we fell upon on the 22nd of September; and dreading, as we had done, the idea of coasting its barren shores, they returned to make an attempt at crossing here. St. Germain now proposed to make a canoe of the fragments of painted canvass, in which we wrapped up our bedding. This scheme appearing practicable, a party was sent to our encampment of the 24th and 25th last, to collect pitch amongst the small pines that grew there, to pay over the seams of the canoe.

In the afternoon we had a heavy fall of snow, which continued all the night. A small quantity of *tripe de roche* was gathered; and Crédit, who had been hunting, brought in the antlers and back bone of a deer which had been killed in the summer. The wolves and birds of prey had picked them clean, but there still remained a quantity of the spinal marrow which they had not been able to extract. This, although putrid, was esteemed a valuable prize, and the spine being divided into portions, was distributed equally. After eating the marrow, which was so acrid as to excoriate the lips, we rendered the bones friable by burning, and ate them also.

On the following morning the ground was covered with snow to the depth of a foot and a half, and the weather was very stormy. These circumstances rendered the men again extremely despondent; a settled gloom hung over their countenances, and they refused to pick *tripe de roche*, choosing rather to go entirely without eating, than to make any exertion. The party which went for gum returned early in the morning without having found any; but

St. Germain said he could still make the canoe with the willows covered with the canvass, and removed with Adam to a clump of willows for that purpose. Mr. Back accompanied them to stimulate his exertion, as we feared the lowness of his spirits would cause him to be slow in his operations. Augustus went to fish at the rapid, but a large trout having carried away his bait, we had nothing to replace it.

The snow storm continued all the night, and during the forenoon of the 3d. Having persuaded the people to gather some *tripe de roche*, I partook of a meal with them; and afterwards set out with the intention of going to St. Germain to hasten his operations, but though he was only three quarters of a mile distant, I spent three hours in a vain attempt to reach him, my strength being unequal to the labour of wading through the deep snow; and I returned quite exhausted, and much shaken by the numerous falls I had got. My associates were all in the same debilitated state, and poor Hood was reduced to a perfect shadow, from the severe bowel complaints which the *tripe de roche* never failed to give him. Back was so feeble as to require the support of a stick in walking; and Dr. Richardson had lameness superadded to weakness. The voyagers were somewhat stronger than ourselves, but more indisposed to exertion, on account of their despondency. The sensation of hunger was no longer felt by any of us, yet we were scarcely able to converse upon any other subject than the pleasures of eating. We were much indebted to Hepburn at this crisis. The officers were unable from weakness to gather *tripe de roche* themselves, and Semandrè, who had acted as our cook on the journey from the coast, sharing in the despair of the rest of the Canadians, refused to make the slightest exertion. Hepburn, on the contrary, animated by a firm reliance on the beneficence of the Supreme Being, tempered with resignation to his will, was indefatigable in his exertions to serve us, and daily collected all the *tripe de roche* that was used in

the officers' mess. Mr. Hood could not partake of this miserable fare, and a partridge which had been reserved for him was, I lament to say, this day stolen by one of the men.

October 4.—The canoe being finished, it was brought to the encampment, and the whole party being assembled in anxious expectation on the beach, St. Germain embarked, and amidst our prayers for his success, succeeded in reaching the opposite shore. The canoe was then drawn back again, and another person transported, and in this manner by drawing it backwards and forwards, we were all conveyed over without any serious accident. By these frequent traverses the canoe was materially injured; and latterly it filled each time with water before reaching the shore, so that all our garments and bedding were wet, and there was not a sufficiency of willows upon the side on which we now were, to make a fire to dry them.

That no time might be lost in procuring relief, I immediately despatched Mr. Back with St. Germain, Solomon Belanger, and Beauparlant, to search for the Indians, directing him to go to Fort Enterprise, where we expected they would be, or where, at least, a note from Mr. Wentzel would be found to direct us in our search for them. If St. Germain should kill any animals on his way, a portion of the meat was to be put up securely for us, and conspicuous marks placed over it.

It is impossible to imagine a more gratifying change than was produced in our voyagers after we were all safely landed on the southern banks of the river. Their spirits immediately revived, each of them shook the officers cordially by the hand, and declared they now considered the worst of their difficulties over, as they did not doubt of reaching Fort Enterprise in a few days, even in their feeble condition. We had indeed every reason to be grateful, and our joy would have been complete were it not mingled with sincere regret at the separation of our poor Esquimaux, the faithful Junius.

The want of *tripe de roche* caused us to go supperless to bed. Showers of snow fell frequently during the night. The breeze was light next morning, the weather cold and clear. We were all on foot by day-break, but from the frozen state of our tents and bed clothes, it was long before the bundles could be made, and as usual, the men lingered over a small fire they had kindled, so that it was eight o'clock before we started. Our advance from the depth of the snow was slow, and about noon coming to a spot where there was some *tripe de roche,* we stopped to collect it, and breakfasted. Mr. Hood, who was now very feeble, and Dr. Richardson, who attached himself to him, walked together at a gentle pace in the rear of the party. I kept with the foremost men, to cause them to halt occasionally, until the stragglers came up. Resuming our march after breakfast, we followed the track of Mr. Back's party, and encamped early, as all of us were much fatigued, particularly Crédit, who having to-day carried the men's tent, it being his turn to do so, was so exhausted, that when he reached the encampment he was unable to stand. The *tripe de roche* disagreed with this man and with Vaillant, in consequence of which, they were the first whose strength totally failed. We had a small quantity of this weed in the evening, and the rest of our supper was made up of scraps of roasted leather. The distance walked to-day was six miles. As Crédit was very weak in the morning, his load was reduced to little more than his personal luggage, consisting of his blanket, shoes, and gun. Previous to setting out, the whole party ate the remains of their old shoes, and whatever scraps of leather they had, to strengthen their stomachs for the fatigue of the day's journey. We left the encampment at nine, and pursued our route over a range of bleak hills. The wind having increased to a strong gale in the course of the morning, became piercingly cold, and the drift rendered it difficult for those in the rear to follow the track over the heights, whilst in the valleys, where it was sufficiently marked, from

the depth of the snow, the labour of walking was proportionably great. Those in advance made as usual frequent halts, yet being unable from the severity of the weather to remain long still, they were obliged to move on before the rear could come up, and the party, of course, straggled very much.

About noon Samandrè coming up, informed us that Crédit and Vaillant could advance no further. Some willows being discovered in a valley near to us, I proposed to halt the party there, whilst Dr. Richardson went back to visit them. I hoped too, that when the sufferers received the information of a fire being kindled at so short a distance, they would be cheered, and use their utmost efforts to reach it, but this proved a vain hope. The Doctor found Vaillant about a mile and a half in the rear, much exhausted with cold and fatigue. Having encouraged him to advance to the fire, after repeated solicitations he made the attempt, but fell down amongst the deep snow at every step. Leaving him in this situation, the Doctor went about half a mile farther back, to the spot where Credit was said to have halted, and the track being nearly obliterated by the snow drift, it became unsafe for him to go further. Returning he passed Vaillant, who having moved only a few yards in his absence, had fallen down, was unable to rise, and could scarcely answer his questions. Being unable to afford him any effectual assistance, he hastened on to inform us of his situation. When J. B. Belanger had heard the melancholy account, he went immediately to aid Vaillant, and bring up his burden. Respecting Crédit, we were informed by Samandrè, that he had stopped a short distance behind Vaillant, but that his intention was to return to the encampment of the preceding evening.

When Belanger came back with Vaillant's load, he informed us that he had found him lying on his back, benumbed with cold, and incapable of being roused. The stoutest men of the party were now earnestly entreated to bring him to the fire, but they declared

themselves unequal to the task; and, on the contrary, urged me to allow them to throw down their loads, and proceed to Fort Enterprise with the utmost speed. A compliance with their desire would have caused the loss of the whole party, for the men were totally ignorant of the course to be taken, and none of the officers, who could have directed the march, were sufficiently strong to keep up at the pace they would then walk; besides, even supposing them to have found their way, the strongest men would certainly have deserted the weak. Something, however, was absolutely necessary to be done, to relieve them as much as possible from their burdens, and the officers consulted on the subject. Mr. Hood and Dr. Richardson proposed to remain behind, with a single attendant, at the first place where sufficient wood and *tripe de roche* should be found for ten days' consumption; and that I should proceed as expeditiously as possible with the men to the house, and thence send them immediate relief. They strongly urged that this arrangement would contribute to the safety of the rest of the party, by relieving them from the burden of a tent, and several other articles; and that they might afford aid to Crédit, if he should unexpectedly come up. I was distressed beyond description at the thought of leaving them in such a dangerous situation, and for a long time combated their proposal; but they strenuously urged, that this step afforded the only chance of safety for the party, and I reluctantly acceded to it. The ammunition, of which we had a small barrel, was also to be left with them, and it was hoped that this deposit would be a strong inducement for the Indians to venture across the barren grounds to their aid. We communicated this resolution to the men, who were cheered at the slightest prospect of alleviation of their present miseries, and they promised with great appearance of earnestness to return to those officers, upon the first supply of food.

The party then moved on; Vaillant's blanket and other neces-

saries were left in the track, at the request of the Canadians, without any hope, however, of his being able to reach them. After marching until dusk without seeing a favourable place for encamping, night compelled us to take shelter under the lee of a hill, amongst some willows, with which, after many attempts, we at length made a fire. It was not sufficient, however, to warm the whole party, much less to thaw our shoes; and the weather not permitting the gathering of *tripe de roche*, we had nothing to cook. The painful retrospection of the melancholy events of the day banished sleep, and we shuddered as we contemplated the dreadful effects of this bitterly cold night on our two companions, if still living. Some faint hopes were entertained of Crédit's surviving the storm, as he was provided with a good blanket, and had leather to eat.

The weather was mild next morning. We left the encampment at nine, and a little before noon came to a pretty extensive thicket of small willows, near which there appeared a supply of *tripe de roche* on the face of the rocks. At this place Dr. Richardson and Mr. Hood determined to remain, with John Hepburn, who volunteered to stop with them. The tent was securely pitched, a few willows collected, and the ammunition and all other articles were deposited, except each man's clothing, one tent, a sufficiency of ammunition for the journey, and the officer's journals. I had only one blanket, which was carried for me, and two pair of shoes. The offer was now made for any of the men, who felt themselves too weak to proceed, to remain with the officers, but none of them accepted it. Michel alone felt some inclination to do so. After we had united in thanksgiving and prayers to Almighty God, I separated from my companions, deeply afflicted that a train of melancholy circumstances should have demanded of me the severe trial of parting from friends in such a condition, who had become endeared to me by their constant kindness, and co-operation, and a participation of numerous sufferings. This trial I could not have

been induced to undergo, but for the reasons they had so strongly urged the day before, to which my own judgment assented, and for the sanguine hope I felt of either finding a supply of provision at Fort Enterprise, or meeting the Indians in the immediate vicinity of that place, according to my arrangements with Mr. Wentzel and Akaitcho. Previously to our starting, Peltier and Benoit repeated their promises, to return to them with provision, if any should be found at the house, or to guide the Indians to them, if any were met.

Greatly as Mr. Hood was exhausted, and, indeed, incapable as he must have proved, of encountering the fatigue of our very next day's journey, so that I felt his resolution to be prudent, I was sensible that his determination to remain, was mainly prompted by the disinterested and generous wish to remove impediments to the progress of the rest of the party. Dr. Richardson and Hepburn, who were both in a state of strength to keep pace with the men, beside this motive which they shared with him, were influenced in their resolution to remain; the former by the desire which had distinguished his character, throughout the expedition, of devoting himself to the succour of the weak, and the latter by the zealous attachment he had ever shewn towards his officers.

We set out without waiting to take any of the *tripe de roche*, and walked at a tolerable pace, and in an hour arrived at a fine group of pines, about a mile and a quarter from the tent. We sincerely regretted not having seen these before we had separated from our companions, as they would have been better supplied with fuel here, and there appeared to be more *tripe de roche* than where we had left them.

Descending afterwards into a more level country, we found the snow very deep, and the labour of wading through it so fatigued the whole party, that we were compelled to encamp, after a march of four miles and a half. Belanger and Michel were left far behind,

and when they arrived at the encampment appeared quite exhausted. The former, bursting into tears, declared his inability to proceed with the party, and begged me to let him go back next morning to the tent, and shortly afterwards Michel made the same request. I was in hopes they might recover a little strength by the night's rest and therefore deferred giving any permission until the morning. The sudden failure in the strength of these men cast a gloom over the rest, which I tried in vain to remove, by repeated assurances that the distance to Fort Enterprise was short, and that we should, in all probability, reach it in four days. Not being able to find any *tripe de roche*, we drank an infusion of the Labrador tea plant, *(ledum palustre)*, and ate a few morsels of burnt leather for supper. We were unable to raise the tent, and found its weight too great to carry it on; we, therefore, cut it up, and took a part of the canvass for a cover. The night was bitterly cold, and though we lay as close to each other as possible, having no shelter, we could not keep ourselves sufficiently warm to sleep. A strong gale came on after midnight, which increased the severity of the weather. In the morning Belanger and Michel renewed their request to be permitted to go back to the tent, assuring me they were still weaker than on the preceding evening, and less capable of going forward; and they urged, that the stopping at a place where there was a supply of *tripe de roche* was their only chance of preserving life; under these circumstances, I could not do otherwise than yield to their desire. I wrote a note to Dr. Richardson and Mr. Hood, informing them of the pines we had passed, and recommending their removing thither. Having found that Michel was carrying a considerable quantity of ammunition, I desired him to divide it among my party, leaving him only ten balls and a little shot, to kill any animals he might meet on his way to the tent. This man was very particular in his inquiries respecting the direction of the house, and the course we meant to pursue; he also said, that if he should

be able, he would go and search for Vaillant and Crédit; and he requested my permission to take Vaillant's blanket, if he should find it, to which I agreed, and mentioned it in my notes to the officers.

Scarcely were these arrangements finished, before Perrault and Fontano were seized with a fit of dizziness, and betrayed other symptoms of extreme debility. Some tea was quickly prepared for them, and after drinking it, and eating a few morsels of burnt leather, they recovered, and expressed their desire to go forward; but the other men, alarmed at what they had just witnessed, became doubtful of their own strength, and, giving way to absolute dejection, declared their own inability to move. I now earnestly pressed upon them the necessity of continuing our journey, as the only means of saving their own lives, as well as those of our friends at the tent; and, after much entreaty, got them to set out at ten A.M.: Belanger and Michel were left at the encampment, and proposed to start shortly afterwards. By the time we had gone about two hundred yards, Perrault became again dizzy, and desired us to halt, which we did, until he, recovering, proposed to march on. Ten minutes more had hardly elapsed before he again desired us to stop, and, bursting into tears, declared he was totally exhausted, and unable to accompany us further. As the encampment was not more than a quarter of a mile distant, we proposed that he should return to it, and rejoin Belanger and Michel, whom we knew to be still there, from perceiving the smoke of a fresh fire; and because they had not made any preparation for starting when we left them. He readily acquiesced in the proposition, and having taken a friendly leave of each of us, and enjoined us to make all the haste we could in sending relief, he turned back, keeping his gun and ammunition. We watched him until he was near to the fire, and then proceeded. During these detentions, Augustus becoming impatient of the delay, had walked on, and we lost sight of him. The labour we

experienced in wading through the deep snow induced us to cross a moderate sized lake, which lay in our track, but we found this operation far more harassing. As the surface of the ice was perfectly smooth, we slipt at almost every step, and were frequently blown down by the wind with such force as to shake our whole frames.

Poor Fontano was completely exhausted by the labour of making this traverse, and we made a halt until his strength was recruited, by which time the party was benumbed with cold. Proceeding again, he got on tolerably well for a little time, but being again seized with faintness and dizziness, he fell often, and at length exclaimed that he could go no further. We immediately stopped, and endeavoured to encourage him to persevere, until we should find some willows, to encamp; he insisted, however, that he could not march any longer through this deep snow; and said, that if he should even reach our encampment this evening, he must be left there, provided *tripe de roche* could not be procured to recruit his strength. The poor man was overwhelmed with grief, and seemed desirous to remain at that spot. We were about two miles from the place where the other men had been left, and as the track to it was beaten, we proposed to him to return thither, as we thought it probable he would find the men still there: at any rate, he would be able to get fuel to keep him warm during the night; and, on the next day, he could follow their track to the officers' tent; and, should the path be covered by the snow, the pines we had passed yesterday would guide him, as they were yet in view.

I cannot describe my anguish on the occasion of separating from another companion under circumstances so distressing. There was, however, no alternative. The extreme debility of the rest of the party, put the carrying him quite out of the question, as he himself admitted; and it was evident that the frequent delays he must occasion if he accompanied us, and did not gain strength, must have endangered the lives of the whole. By returning he had the prospect

of getting to the tent where *tripe de roche* could be obtained, which agreed with him better than with any other of the party, and which he was always very assiduous in gathering. After some hesitation he determined on returning, and set out, having bid each of us farewell in the tenderest manner. We watched him with inexpressible anxiety for some time, and were rejoiced to find, though he got on slowly, that he kept on his legs better than before. Antonio Fontano was an Italian, and had served many years in De Meuron's regiment. He had spoken to me that very morning, and after his first attack of dizziness, about his father; and had begged, that should he survive, I would take him with me to England, and put him in the way of reaching home.

The party was now reduced to five persons, Adam, Peltier, Benoit, Samandré, and myself. Continuing the journey, we came, after an hour's walk, to some willows, and encamped under the shelter of a rock, having walked in the whole four miles and a half. We made an attempt to gather some *tripe de roche*, but could not, owing to the severity of the weather. Our supper, therefore, consisted of tea and a few morsels of leather.

Augustus did not make his appearance, but we felt no alarm at his absence, supposing he would go to the tent if he missed our track. Having fire, we procured a little sleep. Next morning the breeze was light and the weather mild, which enabled us to collect some *tripe de roche*, and to enjoy the only meal we had for four days. We derived great benefit from it, and walked with considerably more ease than yesterday. Without the strength it supplied, we should certainly have been unable to oppose the strong breeze we had in the afternoon. After walking about five miles, we came upon the borders of Marten Lake, and were rejoiced to find it frozen, so that we could continue our course straight for Fort Enterprize. We encamped at the first rapid in Winter River amidst willows and alders; but these were so frozen, and the snow fell so thick, that the

men had great difficulty in making a fire. This proving insufficient to warm us, or even thaw our shoes, and having no food to prepare, we crept under our blankets. The arrival in a well-known part raised the spirits of the men to a high pitch, and we kept up a cheerful conversation until sleep overpowered us. The night was very stormy, and the morning scarcely less so; but, being desirous to reach the house to-day, we commenced our journey very early. We were gratified by the sight of a large herd of rein-deer on the side of the hill near the track, but our only hunter, Adam, was too feeble to pursue them. Our shoes and garments were stiffened by the frost, and we walked in great pain until we arrived at some stunted pines, at which we halted, made a good fire, and procured the refreshment of tea. The weather becoming fine in the afternoon, we continued our journey, passed the Dog-rib Rock, and encamped among a clump of pines of considerable growth, about a mile further on. Here we enjoyed the comfort of a large fire for the first time since our departure from the sea-coast; but this gratification was purchased at the expense of many severe falls that we had in crossing a stony valley, to get to these pines. There was no *tripe de roche*, and we drank tea and ate some of our shoes for supper. Next morning, after taking the usual repast of tea, we proceeded to the house. Musing on what we were likely to find there, our minds were agitated between hope and fear, and, contrary to the custom we had kept up, of supporting our spirits by conversation, we went silently forward.

At length we reached Fort Enterprise, and to our infinite disappointment and grief found it a perfectly desolate habitation. There was no deposit of provision, no trace of the Indians, no letter from Mr. Wentzel to point out where the Indians might be found. It would be impossible for me to describe our sensations after entering this miserable abode, and discovering how we had been neglected: the whole party shed tears, not so much for our own fate, as for that of

our friends in the rear, whose lives depended entirely on our sending immediate relief from this place.

I found a note, however, from Mr. Back, stating that he had reached the house two days ago, and was going in search of the Indians, at a part where St. Germain deemed it probable they might be found. If he was unsuccessful, he purposed walking to Fort Providence, and sending succour from thence. But he doubted whether either he or his party could perform the journey to that place in their present debilitated state. It was evident that any supply that could be sent from Fort Providence would be long in reaching us, and could not be sufficient to enable us to afford any assistance to our companions behind, and that the only relief for them must be procured from the Indians. I resolved, therefore, in going also in search of them; but my companions were absolutely incapable of proceeding, and I thought, by halting two or three days they might gather a little strength, whilst the delay would afford us the chance of learning whether Mr. Back had seen the Indians.

We now looked round for the means of subsistence, and were gratified to find several deer skins, which had been thrown away during our former residence. The bones were gathered from the heap of ashes, these with the skins, and the addition of *tripe de roche*, we considered would support us tolerably well for a time. As to the house, the parchment being torn from the windows, the apartment we selected for our abode was exposed to all the rigour of the season. We endeavoured to exclude the wind as much as possible, by placing loose boards against the apertures. The temperature was now between 15° and 20° below zero. We procured fuel by pulling up the flooring of the other rooms, and water for the purpose of cooking, by melting the snow. Whilst we were seated round the fire, singeing the deer skin for supper, we were rejoiced by the unexpected entrance of Augustus. He had followed quite a different course from ours, and the circumstance of his

having found his way through a part of the country he had never been in before, must be considered a remarkable proof of sagacity. The unusual earliness of this winter became manifest to us from the state of things at this spot. Last year at the same season, and still later, there had been very little snow on the ground, and we were surrounded by vast herds of rein-deer. Now there were but few recent tracks of these animals, and the snow was upwards of two feet deep. Winter River was then open, now it was frozen two feet thick.

When I arose the following morning, my body and limbs were so swollen that I was unable to walk more than a few yards. Adam was in a still worse condition, being absolutely incapable of rising without assistance. My other companions fortunately experienced this inconvenience in a less degree, and went to collect bones, and some *tripe de roche* which supplied us with two meals. The bones were quite acrid, and the soup extracted from them excoriated the mouth if taken alone, but it was somewhat milder when boiled with *tripe de roche,* and we even thought the mixture palatable, with the addition of salt, of which a cask had been fortunately left here in the spring. Augustus to-day set two fishing lines below the rapid. On his way thither he saw two deer, but had not strength to follow them.

On the 13th the wind blew violently from south-east, and the snow drifted so much, that the party were confined to the house. In the afternoon of the following day Belanger arrived with a note from Mr. Back, stating that he had seen no trace of the Indians, and desiring further instructions as to the course he should pursue. Belanger's situation, however, required our first care, as he came in almost speechless, and covered with ice, having fallen into a rapid, and, for the third time since we left the coast, narrowly escaped drowning. He did not recover sufficiently to answer our questions, until we had rubbed him for some time, changed his dress, and

given him some warm soup. My companions nursed him with the greatest kindness, and the desire of restoring him to health seemed to absorb all regard for their own situation. I witnessed with peculiar pleasure this conduct, so different from that which they had recently pursued, when every tender feeling was suspended by the desire of self-preservation. They now no longer betrayed impatience or despondency, but were composed and cheerful, and had entirely given up the practice of swearing, to which the Canadian voyagers are so lamentably addicted. Our conversation naturally turned upon the prospect of getting relief, and upon the means which were best adapted for obtaining it. The absence of all traces of Indians on Winter River, convinced me that they were at this time on the way to Fort Providence, and that by proceeding towards that post we should overtake them, as they move slowly when they have their families with them. This route also offered us the prospect of killing deer, in the vicinity of Rein-deer Lake, in which neighbourhood, our men in their journeys to and fro last winter, had always found them abundant. Upon these grounds I determined on taking the route to Fort Providence as soon as possible, and wrote to Mr. Back desiring him to join me at Rein-deer Lake, and detailing the occurrences since we had parted, that our friends might receive relief, in case of any accident happening to me.

Belanger did not recover sufficient strength to leave us before the 18th. His answers as to the exact part of Round-Rock Lake in which he had left Mr. Back, were very unsatisfactory; and we could only collect that it was at a considerable distance, and he was still going on with the intention of halting at the place where Akaitcho was encamped last summer, about thirty miles off. This distance appeared so great, that I told Belanger it was very unsafe for him to attempt it alone, and that he would be several days in accomplishing it. He stated, however, that as the track was beaten, he should

experience little fatigue, and seemed so confident, that I suffered him to depart with a supply of singed hide. Next day I received information which explained why he was so unwilling to acquaint us with the situation of Mr. Back's party. He dreaded that I should resolve upon joining it, when our numbers would be so great as to consume at once every thing St. Germain might kill, if by accident he should be successful in hunting. He even endeavoured to entice away our other hunter Adam, and proposed to him to carry off the only kettle we had, and without which we could not have subsisted two days. Adam's inability to move, however, precluded him from agreeing to the proposal, but he could assign no reason for not acquainting me with it, previous to Belanger's departure. I was at first inclined to consider the whole matter as a fiction of Adam's, but he persisted in his story without wavering; and Belanger, when we met again, confessed that every part of it was true. It is painful to have to record a fact so derogatory to human nature, but I have deemed it proper to mention it, to shew the difficulties we had to contend with, and the effect which distress had in warping the feelings and understanding of the most diligent and obedient of our party; for such Belanger had been always esteemed up to this time.

In making arrangements for our departure, Adam disclosed to me, for the first time, that he was affected with œdematous swellings in some parts of the body, to such a degree as to preclude the slightest attempt at marching; and upon my expressing my surprise at his having hitherto concealed from me the extent of his malady, among other explanations the details of the preceding story came out. It now became necessary to abandon the original intention of proceeding with the whole party towards Fort Providence, and Peltier and Samandrè having volunteered to remain with Adam, I determined on setting out with Benoit and Augustus, intending to send them relief by the first party of Indians we should meet. My clothes

were so much torn, as to be quite inadequate to screen me from the wind, and Peltier and Samandrè fearing that I might suffer on the journey in consequence, kindly exchanged with me parts of their dress, desiring me to send them skins in return by the Indians. Having patched up three pair of snow-shoes, and singed a considerable quantity of skin for the journey, we started on the morning of the 20th. Previous to my departure, I packed up the journals of the officers, the charts, and some other documents, together with a letter addressed to the Under-Secretary of State, detailing the occurrences of the Expedition up to this period, which package was given in charge to Peltier and Samandrè, with direction that it should be brought away by the Indians who might come to them. I also instructed them to forward succour immediately on its arrival to our companions in the rear, which they solemnly promised to do, and I left a letter for my friends, Richardson and Hood, to be sent at the same time. I thought it necessary to admonish Peltier, Samandrè, and Adam, to eat two meals every day, in order to keep up their strength, which they promised me they would do. No language that I can use could adequately describe the parting scene. I shall only say there was far more calmness and resignation to the Divine will evinced by every one than could have been expected. We were all cheered by the hope that the Indians would be found by the one party, and relief sent to the other. Those who remained entreated us to make all the haste we could, and expressed their hope of seeing the Indians in ten or twelve days.

At first starting we were so feeble as scarcely to be able to move forwards, and the descent of the bank of the river through the deep snow was a severe labour. When we came upon the ice, where the snow was less deep, we got on better, but after walking six hours we had only gained four miles, and were then compelled by fatigue to encamp on the borders of Round-Rock Lake. Augustus tried for

fish here, but without success, so that our fare was skin and tea. Composing ourselves to rest, we lay close to each other for warmth. We found the night bitterly cold, and the wind pierced through our famished frames.

The next morning was mild and pleasant for travelling, and we set out after breakfast. We had not, however, gone many yards before I had the misfortune to break my snow shoes by falling between two rocks. This accident prevented me from keeping pace with Benoit and Augustus, and in the attempt I became quite exhausted. Being convinced that their being delayed on my account might prove of fatal consequence to the rest, I resolved on returning to the house, and letting them proceed alone in search of the Indians. I therefore halted them only whilst I wrote a note to Mr. Back, stating the reason of my return, and requesting he would send meat from Rein-Deer Lake by these men, if St. Germain should kill any animals there. If Benoit should miss Mr. Back, I directed him to proceed to Fort Providence, and furnished him with a letter to the gentleman in charge of it, requesting immediate supplies might be sent to us.

On my arrival at the house, I found Samandrè very dispirited, and too weak, as he said, to render any assistance to Peltier; upon whom the whole labour of getting wood and collecting the means of subsistence would have devolved. Conscious, too, that his strength would have been unequal to these tasks, they had determined upon taking only one meal each day; under these circumstances I considered my return as particularly fortunate, as I hoped to stimulate Samandrè to exertion, and at any rate I could contribute some help to Peltier. I undertook the office of cooking, and insisted they should eat twice a-day whenever food could be procured, but as I was too weak to pound the bones, Peltier agreed to do that in addition to his more fatiguing task of getting wood. We had a violent

snow storm all the next day, and this gloomy weather contributed to the depression of spirits under which Adam and Samandrè were labouring. Neither of them would quit their beds, and they scarcely ceased from shedding tears all day; in vain did Peltier and myself endeavour to cheer them. We had even to use much entreaty before we prevailed upon them to take the meals we had prepared. Our situation was indeed distressing, but in comparison with that of our friends in the rear, we considered it happy. Their condition gave us unceasing solicitude, and was the principal subject of our conversation.

Though the weather was stormy on the 26th, Samandrè assisted me to gather *tripe de roche*. Adam, who was very ill, and could not now be prevailed upon to eat this weed, subsisted principally on bones, though he also partook of the soup. The *tripe de roche* had hitherto afforded us our chief support, and we naturally felt great uneasiness at the prospect of being deprived of it, by its being so frozen as to render it impossible for us to gather it.

We perceived our strength decline every day, and every exertion began to be irksome; when we were once seated the greatest effort was necessary in order to rise, and we had frequently to lift each other from our seats; but even in this pitiable condition we conversed cheerfully, being sanguine as to the speedy arrival of the Indians. We calculated indeed that if they should be near the situation where they had remained last winter, our men would have reached them by this day. Having expended all the wood which we could procure from our present dwelling, without endangering its falling, Peltier began this day to pull down the partitions of the adjoining houses. Though these were only distant about twenty yards, yet the increase of labour in carrying the wood fatigued him so much, that by the evening he was exhausted. On the next day his weakness was such, especially in the arms, of which he chiefly complained, that he with difficulty lifted the hatchet: still he persevered, Sa-

mandrè and I assisting him in bringing in the wood, but our united strength could only collect sufficient to replenish the fire four times in the course of the day. As the insides of our mouths had become sore from eating the bone-soup, we relinquished the use of it, and now boiled our skin, which mode of dressing we found more palatable than frying it, as we had hitherto done.

On the 29th, Peltier felt his pains more severe, and could only cut a few pieces of wood. Samandrè, who was still almost as weak, relieved him a little time, and I assisted them in carrying in the wood. We endeavoured to pick some *tripe de roche*, but in vain, as it was entirely frozen. In turning up the snow, in searching for bones, I found several pieces of bark, which proved a valuable acquisition, as we were almost destitute of dry wood proper for kindling the fire. We saw a herd of rein-deer sporting on the river, about half a mile from the house; they remained there a considerable time, but none of the party felt themselves sufficiently strong to go after them, nor was there one of us who could have fired a gun without resting it.

Whilst we were seated round the fire this evening, discoursing about the anticipated relief, the conversation was suddenly interrupted by Peltier's exclaiming with joy, "*Ah! le monde!*" imagining that he heard the Indians in the other room; immediately afterwards, to his bitter disappointment, Dr. Richardson and Hepburn entered, each carrying his bundle. Peltier, however, soon recovered himself enough to express his joy at their safe arrival, and his regret that their companions were not with them. When I saw them alone my own mind was instantly filled with apprehensions respecting my friend Hood, and our other companions, which were immediately confirmed by the Doctor's melancholy communication, that Mr. Hood and Michel were dead. Perrault and Fontano had neither reached the tent, nor been heard of by them. This intelligence produced a melancholy despondency in the minds of my party, and on that

account the particulars were deferred until another opportunity. We were all shocked at beholding the emaciated countenances of the Doctor and Hepburn, as they strongly evidenced their extremely debilitated state. The alteration in our appearance was equally distressing to them, for since the swellings had subsided we were little more than skin and bone. The Doctor particularly remarked the sepulchral tone of our voices, which he requested us to make more cheerful if possible, unconscious that his own partook of the same key.

Hepburn having shot a partridge, which was brought to the house, the Doctor tore out the feathers, and having held it to the fire a few minutes, divided it into seven portions. Each piece was ravenously devoured by my companions, as it was the first morsel of flesh any of us had tasted for thirty-one days, unless indeed the small gristly particles which we found occasionally adhering to the pounded bones may be termed flesh. Our spirits were revived by this small supply, and the Doctor endeavoured to raise them still higher by the prospect of Hepburn's being able to kill a deer next day, as they had seen, and even fired at, several near the house. He endeavoured, too, to rouse us to some attention to the comfort of our apartment, and particularly to roll up, in the day, our blankets which (expressly for the convenience of Adam and Samandrè,) we had been in the habit of leaving by the fire where we lay on them. The Doctor having brought his prayer-book and testament, some prayers and psalms, and portions of scripture, appropriate to our situation, were read, and we retired to bed.

Next morning the Doctor and Hepburn went out early in search of deer; but, though they saw several herds and fired some shots, they were not so fortunate as to kill any, being too weak to hold their guns steadily. The cold compelled the former to return soon, but Hepburn persisted until late in the evening.

My occupation was to search for skins under the snow, it being

now our object immediately to get all that we could, but I had not strength to drag in more than two of those which were within twenty yards of the house until the Doctor came and assisted me. We made up our stock to twenty-six, but several of them were putrid, and scarcely eatable, even by men suffering the extremity of famine. Peltier and Samandrè continued very weak and dispirited, and they were unable to cut fire-wood. Hepburn had in consequence that laborious task to perform after he came back. The Doctor having scarified the swelled parts of Adam's body, a large quantity of water flowed out, and he obtained some ease, but still kept his bed.

After our usual supper of singed skin and bone soup, Dr. Richardson acquainted me with the afflicting circumstances attending the death of Mr. Hood and Michel, and detailed the occurrences subsequent to my departure from them, which I shall give from his journal, in his own words; but, I must here be permitted to express the heart-felt sorrow with which I was overwhelmed at the loss of so many companions; especially for that of my friend Mr. Hood, to whose zealous and able co-operation I had been indebted for so much invaluable assistance during the Expedition, whilst the excellent qualities of his heart engaged my warmest regard. His scientific observations, together with his maps and drawings (a small part of which only appear in this work), evince a variety of talent, which, had his life been spared, must have rendered him a distinguished ornament to his profession, and which will cause his death to be felt as a loss to the service.

Dr. RICHARDSON's NARRATIVE.

After Captain Franklin had bidden us farewell we remained seated by the fire-side as long as the willows, the men had cut for us before they departed, lasted. We had no *tripe de roche* that day, but drank an infusion of the country tea-plant, which was grateful from its warmth, although it afforded no sustenance. We then retired to bed, where we remained all the next day, as the weather was stormy, and the snow-drift so heavy, as to destroy every prospect of success in our endeavours to light a fire with the green and frozen willows, which were our only fuel. Through the extreme kindness and forethought of a lady, the party, previous to leaving London, had been furnished with a small collection of religious books, of which we still retained two or three of the most portable, and they proved of incalculable benefit to us. We read portions of them to each other as we lay in bed, in addition to the morning and evening service, and found that they inspired us on each perusal with so strong a sense of the omnipresence of a beneficent God, that our situation, even in these wilds, appeared no longer destitute; and we conversed, not only with calmness, but with cheerfulness, detailing with unrestrained confidence the past events of our lives, and dwelling with hope on our future prospects. Had my poor friend been spared to revisit his native land, I should look back to this period with unalloyed delight.

On the morning of the 29th, the weather, although still cold, was clear, and I went out in quest of *tripe de roche,* leaving Hepburn to cut willows for a fire, and Mr. Hood in bed. I had no success, as yesterday's snow drift was so frozen on the surface of the rocks that I could not collect any of the weed; but, on my return to the tent, I found that Michel, the Iroquois, had come with a note from

Mr. Franklin, which stated, that this man, and Jean Baptiste Belanger being unable to proceed, were about to return to us, and that a mile beyond our present encampment there was a clump of pine trees, to which he recommended us to remove the tent. Michel informed us that he quitted Mr. Franklin's party yesterday morning, but, that having missed his way, he had passed the night on the snow a mile or two to the northward of us. Belanger, he said, being impatient, had left the fire about two hours earlier, and, as he had not arrived, he supposed he had gone astray. It will be seen in the sequel, that we had more than sufficient reason to doubt the truth of this story.

Michel now produced a hare and a partridge which he had killed in the morning. This unexpected supply of provision was received by us with a deep sense of gratitude to the Almighty for his goodness, and we looked upon Michel as the instrument he had chosen to preserve all our lives. He complained of cold, and Mr. Hood offered to share his buffalo robe with him at night: I gave him one of two shirts which I wore, whilst Hepburn, in the warmth of his heart, exclaimed, "How I shall love this man if I find that he does not tell lies like the others." Our meals being finished, we arranged that the greatest part of the things should be carried to the pines the next day; and, after reading the evening service, retired to bed full of hope.

Early in the morning Hepburn, Michel, and myself, carried the ammunition, and most of the other heavy articles to the pines. Michel was our guide, and it did not occur to us at the time that his conducting us perfectly straight was incompatible with his story of having gone astray on his way to us. He now informed us that he had, on his way to the tent, left on the hill above the pines a gun and forty-eight balls, which Perrault had given to him when with the rest of Mr. Franklin's party, he took leave of him. It will be seen, on a reference to Mr. Franklin's journal, that Perrault

carried his gun and ammunition with him when they parted from Michel and Belanger. After we had made a fire, and drank a little of the country tea, Hepburn and I returned to the tent, where we arrived in the evening, much exhausted with our journey. Michel preferred sleeping where he was, and requested us to leave him the hatchet, which we did, after he had promised to come early in the morning to assist us in carrying the tent and bedding. Mr. Hood remained in bed all day. Seeing nothing of Belanger to-day, we gave him up for lost.

On the 11th, after waiting until late in the morning for Michel, who did not come, Hepburn and I loaded ourselves with the bedding, and, accompanied by Mr. Hood, set out for the pines. Mr. Hood was much affected with dimness of sight, giddiness, and other symptoms of extreme debility, which caused us to move very slow, and to make frequent halts. On arriving at the pines, we were much alarmed to find that Michel was absent. We feared that he had lost his way in coming to us in the morning, although it was not easy to conjecture how that could have happened, as our foot-steps of yesterday were very distinct. Hepburn went back for the tent, and returned with it after dusk, completely worn out with the fatigue of the day. Michel too arrived at the same time, and re-lieved our anxiety on his account. He reported that he had been in chase of some deer which passed near his sleeping-place in the morning, and although he did not come up with them, yet that he found a wolf which had been killed by the stroke of a deer's horn, and had brought a part of it. We implicitly believed this story then, but afterwards became convinced from circumstances, the detail of which may be spared, that it must have been a portion of the body of Belanger or Perrault. A question of moment here presents itself; namely, whether he actually murdered these men, or either of them, or whether he found the bodies on the snow. Captain Franklin, who is the best able to judge of this matter, from knowing

their situation when he parted from them, suggested the former idea, and that both Belanger and Perrault had been sacrificed. When Perrault turned back, Captain Franklin watched him until he reached a small group of willows, which was immediately adjoining to the fire, and concealed it from view, and at this time the smoke of fresh fuel was distinctly visible. Captain Franklin conjectures, that Michel having already destroyed Belanger, completed his crime by Perrault's death, in order to screen himself from detection. Although this opinion is founded only on circumstances, and is unsupported by direct evidence, it has been judged proper to mention it, especially as the subsequent conduct of the man shewed that he was capable of committing such a deed. The circumstances are very strong. It is not easy to assign any other adequate motive for his concealing from us that Perrault had turned back, and his request overnight that we should leave him the hatchet; and his cumbering himself with it when he went out in the morning, unlike a hunter who makes use only of his knife when he kills a deer, seem to indicate that he took it for the purpose of cutting up something that he knew to be frozen. These opinions, however, are the result of subsequent consideration. We passed this night in the open air.

On the following morning the tent was pitched, and Michel wĕnt out early, refused my offer to accompany him, and remained out the whole day. He would not sleep in the tent at night, but chose to lie at the fire-side.

On the 13th there was a heavy gale of wind, and we passed the day by the fire. Next day, about two, P.M., the gale abating, Michel set out as he said to hunt, but returned unexpectedly in a very short time. This conduct surprised us, and his contradictory and evasory answers to our questions excited some suspicions, but they did not turn towards the truth.

October 15th.—In the course of this day Michel expressed much regret that he had stayed behind Mr. Franklin's party, and declared

that he would set out for the house at once if he knew the way. We endeavoured to soothe him, and to raise his hopes of the Indians speedily coming to our relief, but without success. He refused to assist us in cutting wood, but about noon, after much solicitation, he set out to hunt. Hepburn gathered a kettle of *tripe de roche*, but froze his fingers. Both Hepburn and I fatigued ourselves much to-day in pursuing a flock of partridges from one part to another of the group of willows, in which the hut was situated, but we were too weak to be able to approach them with sufficient caution. In the evening Michel returned, having met with no success.

Next day he refused either to hunt or cut wood, spoke in a very surly manner, and threatened to leave us. Under these circumstances, Mr. Hood and I deemed it better to promise if he would hunt diligently for four days, that then we would give Hepburn a letter for Mr. Franklin, a compass, inform him what course to pursue, and let them proceed together to the fort. The non-arrival of the Indians to our relief, now led us to fear that some accident had happened to Mr. Franklin, and we placed no confidence in the exertions of the Canadians that accompanied him, but we had the fullest confidence in Hepburn's returning the moment he could obtain assistance.

On the 17th I went to conduct Michel to where Vaillant's blanket was left, and after walking about three miles, pointed out the hills to him at a distance, and returned to the hut, having gathered a bagful of *tripe de roche* on the way. It was easier to gather this weed on a march than at the tent, for the exercise of walking produced a glow of heat, which enabled us to withstand for a time the cold to which we were exposed in scraping the frozen surface of the rocks. On the contrary, when we left the fire, to collect it in the neighbourhood of the hut, we became chilled at once, and were obliged to return very quickly.

Michel proposed to remain out all night, and to hunt next day

on his way back. He returned in the afternoon of the 18th, having found the blanket, together with a bag containing two pistols, and some other things which had been left beside it. We had some *tripe de roche* in the evening, but Mr. Hood, from the constant griping it produced, was unable to eat more than one or two spoonfuls. He was now so weak as to be scarcely able to sit up at the fire-side, and complained that the least breeze of wind seemed to blow through his frame. He also suffered much from cold during the night. We lay close to each other, but the heat of the body was no longer sufficient to thaw the frozen rime formed by our breaths on the blankets that covered him.

At this period we avoided as much as possible conversing upon the hopelessness of our situation, and generally endeavoured to lead the conversation towards our future prospects in life. The fact is, that with the decay of our strength, our minds decayed, and we were no longer able to bear the contemplation of the horrors that surrounded us. Each of us, if I may be allowed to judge from my own case, excused himself from so doing by a desire of not shocking the feelings of the others, for we were sensible of one another's weakness of intellect though blind to our own. Yet we were calm and resigned to our fate, not a murmur escaped us, and we were punctual and fervent in our addresses to the Supreme Being.

On the 19th Michel refused to hunt, or even to assist in carrying a log of wood to the fire, which was too heavy for Hepburn's strength and mine. Mr. Hood endeavoured to point out to him the necesity and duty of exertion, and the cruelty of his quitting us without leaving something for our support; but the discourse far from producing any beneficial effect, seemed only to excite his anger, and amongst other expressions, he made use of the following remarkable one: "It is no use hunting, there are no animals, you had better kill and eat me." At length, however, he went out, but returned very soon, with a report that he had seen three deer,

which he was unable to follow from having wet his foot in a small stream of water thinly covered with ice, and being consequently obliged to come to the fire. The day was rather mild and Hepburn and I gathered a large kettleful of *tripe de roche*; Michel slept in the tent this night.

Sunday, October 20.—In the morning we again urged Michel to go a hunting that he might if possible leave us some provision, to-morrow being the day appointed for his quitting us; but he shewed great unwillingness to go out, and lingered about the fire, under the pretence of cleaning his gun. After we had read the morning service I went about noon to gather some *tripe de roche*, leaving Mr. Hood sitting before the tent at the fire-side, arguing with Michel; Hepburn was employed cutting down a tree at a short distance from the tent, being desirous of accumulating a quantity of fire wood before he left us. A short time after I went out I heard the report of a gun, and about ten minutes afterwards Hepburn called to me in a voice of great alarm, to come directly. When I arrived, I found poor Hood lying lifeless at the fire-side, a ball having apparently entered his forehead. I was at first horror-struck with the idea, that in a fit of despondency he had hurried himself into the presence of his Almighty Judge, by an act of his own hand; but the conduct of Michel soon gave rise to other thoughts, and excited suspicions which were confirmed, when upon examining the body, I discovered that the shot had entered the back part of the head, and passed out at the forehead, and that the muzzle of the gun had been applied so close as to set fire to the night-cap behind. The gun, which was of the longest kind supplied to the Indians, could not have been placed in a position to inflict such a wound, except by a second person. Upon inquiring of Michel how it happened, he replied, that Mr. Hood had sent him into the tent for the short gun, and that during his absence the long gun had gone off, he did not know whether by accident or not. He held the

short gun in his hand at the time he was speaking to me. Hepburn afterwards informed me that previous to the report of the gun Mr. Hood and Michel were speaking to each other in an elevated angry tone; that Mr. Hood being seated at the fire-side, was hid from him by intervening willows, but that on hearing the report he looked up, and saw Michel rising up from before the tent-door, or just behind where Mr. Hood was seated, and then going into the tent. Thinking that the gun had been discharged for the purpose of cleaning it, he did not go to the fire at first; and when Michel called to him that Mr. Hood was dead, a considerable time had elapsed. Although I dared not openly to evince any suspicion that I thought Michel guilty of the deed, yet he repeatedly protested that he was incapable of committing such an act, kept constantly on his guard, and carefully avoided leaving Hepburn and me together. He was evidently afraid of permitting us to converse in private, and whenever Hepburn spoke, he inquired if he accused him of the murder. It is to be remarked, that he understood English very imperfectly, yet sufficiently to render it unsafe for us to speak on the subject in his presence. We removed the body into a clump of willows behind the tent, and, returning to the fire, read the funeral service in addition to the evening prayers. The loss of a young officer, of such distinguished and varied talents and application, may be felt and duly appreciated by the eminent characters under whose command he had served; but the calmness with which he contemplated the probable termination of a life of uncommon promise; and the patience and fortitude with which he sustained, I may venture to say, unparalleled bodily sufferings, can only be known to the companions of his distresses. Owing to the effect that the *tripe de roche* invariably had, when he ventured to taste it, he undoubtedly suffered more than any of the survivors of the party. *Bickersteth's Scripture Help* was lying open beside the body, as if it had fallen from his hand, and it is probable

that he was reading it at the instant of his death. We passed the night in the tent together without rest, every one being on his guard. Next day, having determined on going to the Fort, we began to patch and prepare our clothes for the journey. We singed the hair off a part of the buffalo robe that belonged to Mr. Hood, and boiled and ate it. Michel tried to persuade me to go to the woods on the Copper-Mine River, and hunt for deer instead of going to the Fort. In the afternoon a flock of partridges coming near the tent, he killed several which he shared with us.

Thick snowy weather and a head wind prevented us from starting the following day, but on the morning of the 23d we set out, carrying with us the remainder of the singed robe. Hepburn and Michel had each a gun, and I carried a small pistol, which Hepburn had loaded for me. In the course of the march Michel alarmed us much by his gestures and conduct, was constantly muttering to himself, expressed an unwillingness to go to the Fort, and tried to persuade me to go to the southward to the woods, where he said he could maintain himself all the winter by killing deer. In consequence of this behaviour, and the expression of his countenance, I requested him to leave us and to go to the southward by himself. This proposal increased his ill-nature, he threw out some obscure hints of freeing himself from all restraint on the morrow; and I overheard him muttering threats against Hepburn, whom he openly accused of having told stories against him. He also, for the first time, assumed such a tone of superiority in addressing me, as evinced that he considered us to be completely in his power, and he gave vent to several expressions of hatred towards the white people, or as he termed us in the idiom of the voyagers, the French, some of whom, he said, had killed and eaten his uncle and two of his relations. In short, taking every circumstance of his conduct into consideration, I came to the conclusion, that he would attempt to destroy us on the first opportunity that offered, and that he had hitherto abstained from

doing so from his ignorance of the way to the Fort, but that he would never suffer us to go thither in company with him. In the course of the day he had several times remarked that we were pursuing the same course that Mr. Franklin was doing when he left him, and that by keeping towards the setting sun he could find his way himself. Hepburn and I were not in a condition to resist even an open attack, nor could we by any device escape from him. Our united strength was far inferior to his, and, beside his gun, he was armed with two pistols, an Indian bayonet, and a knife. In the afternoon, coming to a rock on which there was some *tripe de roche*, he halted, and said he would gather it whilst we went on, and that he would soon overtake us. Hepburn and I were now left together for the first time since Mr. Hood's death, and he acquainted me with several material circumstances, which he had observed of Michel's behaviour, and which confirmed me in the opinion that there was no safety for us except in his death, and he offered to be the instrument of it. I determined, however, as I was thoroughly convinced of the necessity of such a dreadful act, to take the whole responsibility upon myself; and immediately upon Michel's coming up, I put an end to his life by shooting him through the head with a pistol. Had my own life alone been threatened, I would not have purchased it by such a measure; but I considered myself as intrusted also with the protection of Hepburn's, a man, who, by his humane attentions and devotedness, had so endeared himself to me, that I felt more anxiety for his safety than for my own. Michel had gathered no *tripe de roche*, and it was evident to us that he had halted for the purpose of putting his gun in order, with the intention of attacking us, perhaps, whilst we were in the act of encamping.

I have dwelt in the preceding part of the narrative upon many circumstances of Michel's conduct, not for the purpose of aggravating his crime, but to put the reader in possession of the

reasons that influenced me in depriving a fellow-creature of life. Up to the period of his return to the tent, his conduct had been good and respectful to the officers, and in a conversation between Captain Franklin, Mr. Hood, and myself, at Obstruction Rapid, it had been proposed to give him a reward upon our arrival at a post. His principles, however, unsupported by a belief in the divine truths of Christianity, were unable to withstand the pressure of severe distress. His countrymen, the Iroquois, are generally Christians, but he was totally uninstructed and ignorant of the duties inculcated by Christianity; and from his long residence in the Indian country, seems to have imbibed, or retained, the rules of conduct which the southern Indians prescribe to themselves.

On the two following days we had mild but thick snowy weather, and as the view was too limited to enable us to preserve a straight course, we remained encamped amongst a few willows and dwarf pines, about five miles from the tent. We found a species of *cornicularia*, a kind of lichen, that was good to eat when moistened and toasted over the fire; and we had a good many pieces of singed buffalo hide remaining.

On the 26th, the weather being clear and extremely cold, we resumed our march, which was very painful from the depth of the snow, particularly on the margins of the small lakes that lay in our route. We frequently sunk under the load of our blankets, and were obliged to assist each other in getting up. After walking about three miles and a half, however, we were cheered by the sight of a large herd of rein-deer, and Hepburn went in pursuit of them; but his hand being unsteady through weakness he missed. He was so exhausted by this fruitless attempt that we were obliged to encamp upon the spot, although it was a very unfavourable one.

Next day we had fine and clear, but cold, weather. We set out early, and, in crossing a hill, found a considerable quantity of *tripe de roche*. About noon we fell upon Little Marten Lake, having

walked about two miles. The sight of a place that we knew inspired us with fresh vigour, and there being comparatively little snow on the ice, we advanced at a pace to which we had lately been unaccustomed. In the afternoon we crossed a recent track of a wolverene, which, from a parallel mark in the snow, appeared to have been dragging something. Hepburn traced it, and upon the borders of the lake found the spine of a deer, that it had dropped. It was clean picked, and, at least, one season old; but we extracted the spinal marrow from it, which, even in its frozen state, was so acrid as to excoriate the lips. We encamped within sight of the Dog-rib Rock, and from the coldness of the night and the want of fuel, rested very ill.

On the 28th we rose at day-break, but from the want of the small fire, that we usually made in the mornings to warm our fingers, a very long time was spent in making up our bundles. This task fell to Hepburn's share, as I suffered so much from the cold as to be unable to take my hands out of my mittens. We kept a straight course for the Dog-rib Rock, but, owing to the depth of the snow in the valleys we had to cross, did not reach it until late in the afternoon. We would have encamped, but did not like to pass a second night without fire; and though scarcely able to drag our limbs after us, we pushed on to a clump of pines, about a mile to the southward of the rock, and arrived at them in the dusk of the evening. During the last few hundred yards of our march, our track lay over some large stones, amongst which I fell down upwards of twenty times, and became at length so exhausted that I was unable to stand. If Hepburn had not exerted himself far beyond his strength, and speedily made the encampment and kindled a fire, I must have perished on the spot. This night we had plenty of dry wood.

On the 29th we had clear and fine weather. We set out at sun-rise, and hurried on in our anxiety to reach the house, but our pro-

gress was much impeded by the great depth of the snow in the valleys. Although every spot of ground over which we travelled to-day, had been repeatedly trodden by us, yet we got bewildered in a small lake. We took it for Marten Lake, which was three times its size, and fancied that we saw the rapid and the grounds about the fort, although they were still far distant. Our disappointment when this illusion was dispelled, by our reaching the end of the lake, so operated on our feeble minds as to exhaust our strength, and we decided upon encamping; but upon ascending a small eminence to look for a clump of wood, we caught a glimpse of the Big-Stone, a well known rock upon the summit of a hill opposite to the Fort, and determined upon proceeding. In the evening we saw several large herds of rein-deer, but Hepburn, who used to be considered a good marksman, was now unable to hold the gun straight, and although he got near them all his efforts proved fruitless. In passing through a small clump of pines we saw a flock of partridges, and he succeeded in killing one after firing several shots. We came in sight of the fort at dusk, and it is impossible to describe our sensations, when on attaining the eminence that overlooks it, we beheld the smoke issuing from one of the chimneys. From not having met with any footsteps in the snow, as we drew nigh our once cheerful residence, we had been agitated by many melancholy forebodings. Upon entering the now desolate building, we had the satisfaction of embracing Captain Franklin, but no words can convey an idea of the filth and wretchedness that met our eyes on looking around. Our own misery had stolen upon us by degrees, and we were accustomed to the contemplation of each other's emaciated figures, but the ghastly countenances, dilated eye-balls, and sepulchral voices of Mr. Franklin and those with him were more than we could at first bear.

Conclusion of Dr Richardson's Narrative.

The morning of the 31st was very cold, the wind being strong from the north. Hepburn went again in quest of deer, and the Doctor endeavoured to kill some partridges: both were unsuccessful. A large herd of deer passed close to the house, the Doctor fired once at them, but was unable to pursue them. Adam was easier this day, and left his bed. Peltier and Semandrè were much weaker, and could not assist in the labours of the day. Both complained of soreness in the throat, and Semandrè suffered much from cramps in his fingers. The Doctor and Hepburn began this day to cut the wood, and also brought it to the house, Being too weak to aid in these laborious tasks, I was employed in searching for bones, and cooking, and attending to our more weakly companions.

In the evening Peltier, complaining much of cold, requested of me a portion of a blanket to repair his shirt and drawers. The mending of these articles occupied him and Semandrè until past one A.M., and their spirits were so much revived by the employment, that they conversed even cheerfully the whole time. Adam sat up with them. The Doctor, Hepburn, and myself, went to bed. We were afterwards agreeably surprised to see Peltier and Semandrè carry three or four logs of wood across the room to replenish the fire, which induced us to hope they still possessed more strength than we had supposed.

November 1.—This day was fine and mild. Hepburn went hunting, but was as usual unsuccessful. As his strength was rapidly declining, we advised him to desist from the pursuit of deer; and only to go out for a short time, and endeavour to kill a few partridges for Peltier and Semandrè. The Doctor obtained a little *tripe de roche*, but Peltier could not eat any of it, and Semandrè only a few spoonfuls, owing to the soreness of their throats. In the afternoon Peltier was so much exhausted, that he sat up with difficulty, and looked piteously; at length he slided from his stool upon his bed, as we supposed to sleep, and in this composed state he remained

upwards of two hours, without our apprehending any danger. We were then alarmed by hearing a rattling in his throat, and on the Doctor's examining him, he was found to be speechless. He died in the course of the night. Semandrè sat up the greater part of the day, and even assisted in pounding some bones; but on witnessing the melancholy state of Peltier, he became very low, and began to complain of cold and stiffness of the joints. Being unable to keep up a sufficient fire to warm him, we laid him down and covered him with several blankets. He did not, however, appear to get better, and I deeply lament to add he also died before daylight. We removed the bodies of the deceased into the opposite part of the house, but our united strength was inadequate to the task of interring them, or even carrying them down to the river.

It may be worthy of remark that poor Peltier, from the time of Benoit's departure, had fixed on the first of November as the time when he should cease to expect any relief from the Indians, and had repeatedly said that if they did not arrive by that day, he should not survive.

Peltier had endeared himself to each of us by his cheerfulness, his unceasing activity, and affectionate care and attentions, ever since our arrival at this place. He had nursed Adam with the tenderest solicitude the whole time. Poor Samandrè was willing to have taken his share in the labours of the party, had he not been wholly incapacitated by his weakness and low spirits. The severe shock occasioned by the sudden dissolution of our two companions rendered us very melancholy. Adam became low and despondent, a change which we lamented the more, as we had perceived he had been gaining strength and spirits for the two preceding days. I was particularly distressed by the thought that the labour of collecting wood must now devolve upon Dr. Richardson and Hepburn, and that my debility would disable me from affording them any material assistance; indeed both of them most kindly

urged me not to make the attempt. They were occupied the whole of the next day in tearing down the logs of which the store-house was built, but the mud plastered between them was so hard frozen that the labour of separation exceeded their strength, and they were completely exhausted by bringing in wood sufficient for less than twelve hours' consumption.

I found it necessary in their absence, to remain constantly near Adam, and to converse with him, in order to prevent his reflecting on our condition, and to keep up his spirits as far as possible. I also lay by his side at night.

On the 3d the weather was very cold, though the atmosphere was cloudy. This morning Hepburn was affected with swelling in his limbs, his strength as well as that of the Doctor, was rapidly declining; they continued, however, to be full of hope. Their utmost exertions could only supply wood, to renew the fire thrice, and on making it up the last time we went to bed. Adam was in rather better spirits, but he could not bear to be left alone. Our stock of bones was exhausted by a small quantity of soup we made this evening. The toil of separating the hair from the skins, which in fact were our chief support, had now become so wearisome as to prevent us from eating as much as we should otherwise have done.

November 4.—Calm and comparatively mild weather. The Doctor and Hepburn, exclusive of their usual occupation, gathered some *tripe de roche.* I went a few yards from the house in search of bones, and returned quite fatigued, having found but three. The Doctor again made incisions in Adam's leg, which discharged a considerable quantity of water, and gave him great relief. We read prayers and a portion of the New Testament in the morning and evening, as had been our practice since Dr. Richardson's arrival; and I may remark that the performance of these duties always afforded us the greatest consolation, serving to reanimate our hope in the mercy of the Omnipotent, who alone could save and deliver us.

On the 5th the breezes were light, with dark cloudy weather, and some snow. The Doctor and Hepburn were getting much weaker, and the limbs of the latter were now greatly swelled. They came into the house frequently in the course of the day to rest themselves, and when once seated, were unable to rise without the help of one another, or of a stick. Adam was for the most part in the same low state as yesterday, but sometimes he surprised us by getting up and walking with an appearance of increased strength. His looks were now wild and ghastly, and his conversation was often incoherent.

The next day was fine, but very cold. The swellings in Adam's limbs having subsided, he was free from pain, and arose this morning in much better spirits, and spoke of cleaning his gun ready for shooting partridges, or any animals that might appear near the house, but his tone entirely changed before the day was half over; he became again dejected, and could scarcely be prevailed upon to eat. The Doctor and Hepburn were almost exhausted. The cutting of one log of wood occupied the latter half an hour; and the other took as much time to drag it into the house, though the distance did not exceed thirty yards. I endeavoured to help the Doctor, but my assistance was very trifling. Yet it was evident that, in a day or two, if their strength should continue to decline at the same rate, I should be the strongest of the party.

I may here remark that owing to our loss of flesh, the hardness of the floor, from which we were only protected by a blanket, produced soreness over the body, and especially those parts on which the weight rested in lying, yet to turn ourselves for relief was a matter of toil and difficulty. However, during this period, and indeed all along after the acute pains of hunger, which lasted but three or four days, had subsided, we generally enjoyed the comfort of a few hours' sleep. The dreams which for the most part, but not always accompanied it, were usually (though not invariably,) of a

pleasant character, being very often about the enjoyments of feasting. In the day-time we fell into the practice of conversing on common and light subjects, although we sometimes discussed with seriousness and earnestness topics connected with religion. We generally avoided speaking directly of our present sufferings, or even of the prospect of relief. I observed, that in proportion as our strength decayed, our minds exhibited symptoms of weakness, evinced by a kind of unreasonable pettishness with each other. Each of us thought the other weaker in intellect than himself, and more in need of advice and assistance. So trifling a circumstance as a change of place, recommended by one as being warmer and more comfortable, and refused by the other from a dread of motion, frequently called forth fretful expressions which were no sooner uttered than atoned for, to be repeated perhaps in the course of a few minutes. The same thing often occurred when we endeavoured to assist each other in carrying wood to the fire; none of us were willing to receive assistance, although the task was disproportioned to our strength. On one of these occasions Hepburn was so convinced of this waywardness that he exclaimed, "Dear me, if we are spared to return to England, I wonder if we shall recover our understandings."

November 7.—Adam had passed a restless night, being disquieted by gloomy apprehensions of approaching death, which we tried in vain to dispel. He was so low in the morning as to be scarcely able to speak. I remained in bed by his side to cheer him as much as possible. The Doctor and Hepburn went to cut wood. They had hardly begun their labour, when they were amazed at hearing the report of a musket. They could scarcely believe that there was really any one near, until they heard a shout, and immediately espied three Indians close to the house. Adam and I heard the latter noise, and I was fearful that a part of the house had fallen upon one of my companions, a disaster which had in fact been thought not unlikely.

My alarm was only momentary, Dr. Richardson came in to communicate the joyful intelligence that relief had arrived. He and myself immediately addressed thanksgiving to the throne of mercy for this deliverance, but poor Adam was in so low a state that he could scarcely comprehend the information. When the Indians entered, he attempted to rise but sank down again. But for this seasonable interposition of Providence, his existence must have terminated in a few hours, and that of the rest probably in not many days.

The Indians had left Akaitcho's encampment on the 5th November, having been sent by Mr. Back with all possible expedition, after he had arrived at their tents. They brought but a small supply of provision that they might travel quickly. It consisted of dried deer's meat, some fat, and a few tongues. Dr. Richardson, Hepburn, and I, eagerly devoured the food, which they imprudently presented to us, in too great abundance, and in consequence we suffered dreadfully from indigestion, and had no rest the whole night. Adam being unable to feed himself, was more judiciously treated by them, and suffered less; his spirits revived hourly. The circumstance of our eating more food than was proper in our present condition, was another striking proof of the debility of our minds. We were perfectly aware of the danger, and Dr. Richardson repeatedly cautioned us to be moderate; but he was himself unable to practise the caution he so judiciously recommended.

Boudel-kell, the youngest of the Indians, after resting about an hour, returned to Akaitcho with the intelligence of our situation, and he conveyed a note from me to Mr. Back, requesting another supply of meat as soon as possible. The two others "Crooked-Foot and the Rat," remained to take care of us, until we should be able to move forward.

The note I received by the Indians from Mr. Back, communicated a tale of distress, with regard to himself and his party, as painful

as that which we had suffered; as will be seen hereafter, by his own narrative.

November 8.—The Indians this morning requested us to remove to an encampment on the banks of the river, as they were unwilling to remain in the house in which the bodies of our deceased companions were lying exposed to view. We agreed to remove, but the day proved too stormy, and Dr. Richardson and Hepburn having dragged the bodies to a short distance, and covered them with snow, the objections of the Indians to remain in the house were removed, and they began to clear our room of the accumulation of dirt and fragments of pounded bones. The improved state of our apartment, and the large and cheerful fires they kept up, produced in us a sensation of comfort to which we had long been strangers. In the evening they brought in a pile of dried wood, which was lying on the river-side, and on which we had often cast a wishful eye, being unable to drag it up the bank. The Indians set about every thing with an activity that amazed us. Indeed, contrasted with our emaciated figures and extreme debility, their frames appeared to us gigantic, and their strength supernatural. These kind creatures next turned their attention to our personal appearance, and prevailed upon us to shave and wash ourselves. The beards of the Doctor and Hepburn had been untouched since they left the sea-coast, and were become of a hideous length, and peculiarly offensive to the Indians*. The Doctor and I suffered extremely from distention, and therefore ate sparingly. Hepburn was getting better, and Adam recovered his strength with amazing rapidity.

* The first alvine discharges after we received food, were, as Hearne remarks on a similar occasion, attended with excessive pain. Previous to the arrival of the Indians the urinary secretion was extremely abundant, and we were obliged to rise from bed in consequence upwards of ten times in a night. This was an extreme annoyance in our reduced state. It may, perhaps, be attributed to the quantity of the country tea that we drank.

November 9.—This morning was pleasantly fine. Crooked-Foot caught four large trout in Winter Lake, which were very much prized, especially by the Doctor and myself, who had taken a dislike to meat, in consequence of our sufferings from repletion, which rendered us almost incapable of moving. Adam and Hepburn in a good measure escaped this. Though the night was stormy, and our apartment freely admitted the wind, we felt no inconvenience, the Indians were so very careful in covering us up, and in keeping a good fire; and our plentiful cheer gave such power of resisting the cold, that we could scarcely believe otherwise than that the season had become milder.

On the 13th, the weather was stormy, with constant snow. The Indians became desponding at the non-arrival of the supply, and would neither go to hunt or fish. They frequently expressed their fears of some misfortune having befallen Boudel-kell; and, in the evening, went off suddenly, without apprizing us of their intention, having first given to each of us a handful of pounded meat, which they had reserved. Their departure, at first, gave rise to a suspicion of their having deserted us, not meaning to return, especially as the explanations of Adam, who appeared to be in their secret, were very unsatisfactory. At length, by interrogations, we got from him the information, that they designed to march night and day, until they should reach Akaitcho's encampment, whence they would send us aid. As we had combated their fears about Boudel-kell, they, perhaps, apprehended that we should oppose their determination, and therefore concealed it. We were now left a second time without food, and with appetites recovered, and strongly excited by recent indulgence.

On the following day the Doctor and Hepburn resumed their former occupation of collecting wood, and I was able to assist a little in bringing it into the house. Adam, whose expectation of the arrival of the Indians had been raised by the fineness of the

weather, became, towards night, very desponding, and refused to eat the singed skin. The night was stormy, and there was a heavy fall of snow. The next day he became still more dejected. About eleven Hepburn, who had gone out for wood, came in with the intelligence that a party appeared upon the river. The room was instantly swept, and, in compliance with the prejudices of the Indians, every scrap of skin was carefully removed out of sight; for these simple people imagine, that burning deer-skin renders them unsuccessful in hunting. The party proved to be Crooked-Foot, Thooee-yorre, and the Fop, with the wives of the two latter dragging provisions. They were accompanied by Benoit, one of our own men.

We were rejoiced to learn, by a note from Mr. Back, dated November 11, that he and his companions had so recruited their strength that they were preparing to proceed to Fort Providence. Adam recovered his spirits on the arrival of the Indians, and even walked about the room with an appearance of strength and activity that surprised us all. As it was of consequence to get amongst the rein-deer before our present supply should fail, we made preparations for quitting Fort Enterprise the next day; and, accordingly, at an early hour, on the 16th, having united in thanksgiving and prayer, the whole party left the house after breakfast. Our feelings on quitting the Fort, where we had formerly enjoyed much comfort, if not happiness, and, latterly, experienced a degree of misery scarcely to be paralleled, may be more easily conceived than described. The Indians treated us with the utmost tenderness, gave us their snow-shoes, and walked without themselves, keeping by our sides, that they might lift us when we fell. We descended Winter River, and, about noon, crossed the head of Round-Rock Lake, distant about three miles from the house, where we were obliged to halt, as Dr. Richardson was unable to proceed. The swellings in his limbs rendered him by much the weakest of the party. The Indians prepared our encampment, cooked for us, and

fed us as if we had been children; evincing humanity that would have done honour to the most civilized people. The night was mild, and fatigue made us sleep soundly.

From this period to the 26th of November we gradually continued to improve, under the kindness and attention of our Indians. On this day we arrived in safety at the abode of our chief and companion, Akaitcho. We were received by the party assembled in the leader's tent, with looks of compassion, and profound silence, which lasted about a quarter of an hour, and by which they meant to express their condolence for our sufferings. The conversation did not begin until we had tasted food. The Chief, Akaitcho, shewed us the most friendly hospitality, and all sorts of personal attention, even to cooking for us with his own hands, an office which he never performs for himself. Annœthai-yazzeh and Humpy, the Chief's two brothers, and several of our hunters, with their families, were encamped here, together with a number of old men and women. In the course of the day we were visited by every person of the band, not merely from curiosity, I conceive, but rather from a desire to evince their tender sympathy in our late distress. We learned that Mr. Back, with St. Germain and Belanger, had gone to Fort Providence; and that, previous to his departure, he had left a letter in a *cache* of pounded meat, which we had missed two days ago. As we supposed that this letter might acquaint us with his intentions more fully than we could gather from the Indians, through our imperfect knowledge of their language, Augustus, the Esquimaux, whom we found here in perfect health, and an Indian lad, were despatched to bring it.

We found several of the Indian families in great affliction, for the loss of three of their relatives, who had been drowned in the August preceding, by the upsetting of a canoe near to Fort Enterprise. They bewailed the melancholy accident every morning and evening, by

repeating the names of the persons in a loud singing tone, which was frequently interrupted by bursts of tears. One woman was so affected by the loss of her only son, that she seemed deprived of reason, and wandered about the tents the whole day, crying and singing out his name.

On the 1st of December we removed with the Indians to the southward.

On the 4th, we again set off after the Indians about noon, and soon overtook them, as they had halted, to drag from the water, and cut up and share, a moose-deer, that had been drowned in a rapid part of the river, partially covered with ice. These operations detained us a long time, which was the more disagreeable, as the weather was extremely unpleasant from cold low fogs. We were all much fatigued at the hour of encampment, which was after dark, though the day's journey did not exceed four miles. At every halt the elderly men of the tribe used to make holes in the ice and put in their lines. One of them shared the produce of his fishery with us this evening.

In the afternoon of the 6th, Belanger, and another Canadian, arrived from Fort Providence, sent by Mr. Weeks, with two trains of dogs, some spirits and tobacco for the Indians, a change of dress for ourselves, and a little tea and sugar. They also brought letters for us from England, and from Mr. Back and Mr. Wentzel. By the former we received the gratifying intelligence of the successful termination of Captain Parry's voyage; and were informed of the promotion of myself and Mr. Back, and of poor Hood, our grief for whose loss was renewed by this intelligence. The gratification which it would otherwise have afforded, was materially damped by our sincere regret that he had not lived to receive this just reward of his merit and services. The letter from Mr. Back stated, that the rival Companies in the fur trade had united; but that, owing to

some cause which had not been explained to him, the goods intended as rewards to Akaitcho and his band, which we had demanded in the spring from the North-West Company, were not sent. There were, however, some stores lying for us at Moose-deer Island, which had been ordered for the equipment of our voyagers; and Mr. Back had gone across to that establishment, to make a selection of the articles we could spare for a temporary present to the Indians. The disappointment at the non-arrival of the goods was seriously felt by us, as we had looked forward with pleasure to the time when we should be enabled to recompense our kind Indian friends, for their tender sympathy in our distresses, and the assistance they had so cheerfully and promptly rendered. I now regretted to find, that Mr. Wentzel and his party, in their return from the sea, had suffered severely on their march along the Copper-Mine River, having on one occasion, as he mentioned, had no food but *tripe de roche* for eleven days.

All the Indians flocked to our encampment to learn the news, and to receive the articles brought for them. Having got some spirits and tobacco, they withdrew to the tent of the Chief, and passed the greater part of the night in singing. We had now the indescribable gratification of changing our linen, which we had worn ever since our departure from the sea-coast.

December 8.—After a long conference with Akaitcho, we took leave of him and his kind companions, and set out with two sledges, heavily laden with provision and bedding, drawn by the dogs, and conducted by Belanger and the Canadian sent by Mr. Weeks. Hepburn and Augustus jointly dragged a smaller sledge, laden principally with their own bedding. Adam and Benoit were left to follow with the Indians. We encamped on the Grassy-Lake Portage, having walked about nine miles, principally on the Yellow-Knife River. It was open at the rapids, and in these places we had to ascend its banks, and walk through the woods

for some distance, which was very fatiguing, especially to Dr. Richardson, whose feet were severely galled in consequence of some defect in his snow-shoes.

On the 11th, however, we arrived at the Fort; it was still under the charge of Mr. Weeks. He welcomed us in the most kind manner, immediately gave us changes of dress, and did every thing in his power to make us comfortable.

Our sensations, on being once more in a comfortable dwelling, after the series of hardships and miseries we had experienced, will be much better imagined than any language of mine can describe them. Our first act was again to return our grateful praises to the Almighty for the manifold instances of his mercy towards us. Having found here some articles, which Mr. Back had sent across from Moose-deer Island, I determined on awaiting the arrival of Akaitcho and his party, in order to present these to them, and to assure them of the promised reward, as soon as it could possibly be procured.

In the afternoon of the 14th, Akaitcho, with his whole band, came to the Fort. He smoked his customary pipe, and made an address to Mr. Weeks in the hall, previous to his coming into the room in which Dr. Richardson and I were. We discovered at the commencement of his speech to us, that he had been informed that our expected supplies had not come. He spoke of this circumstance as a disappointment, indeed, sufficiently severe to himself, to whom his band looked up for the protection of their interests, but without attaching any blame to us. "The world goes badly," he said, "all are poor, you are poor, the traders appear to be poor, I and my party are poor likewise; and since the goods have not come in, we cannot have them. I do not regret having supplied you with provisions, for a Copper Indian can never permit white men to suffer from want of food on his lands, without flying to their aid. I trust, however, that we shall, as you say, receive what is due next

autumn; and at all events," he added, in a tone of good-humour, "it is the first time that the white people have been indebted to the Copper Indians." We assured him the supplies should certainly be sent to him by the autumn, if not before. He then cheerfully received the small present we made to himself; and, although we could give a few things only to those who had been most active in our service, the others who, perhaps, thought themselves equally deserving, did not murmur at being left out in the distribution. Akaitcho afterwards expressed a strong desire, that we should represent the character of his nation in a favourable light to our countrymen. "I know," he said, "you write down every occurrence in your books; but probably you have only noticed the bad things we have said and done, and have omitted to mention the good." In the course of the desultory conversation which ensued, he said, that he had been always told by us, to consider the traders in the same light as ourselves; and that, for his part, he looked upon both as equally respectable. This assurance, made in the presence of Mr. Weeks, was particularly gratifying to us, as it completely disproved the defence that had been set up, respecting the injurious reports that had been circulated against us amongst the Indians in the spring; namely, that they were in retaliation for our endeavours to lower the traders in the eyes of the Indians. I take this opportunity of stating my opinion, that Mr. Weeks, in spreading these reports, was actuated by a mistaken idea that he was serving the interest of his employers. On the present occasion, we felt indebted to him for the sympathy he displayed for our distresses, and the kindness with which he administered to our personal wants. After this conference, such Indians as were indebted to the Company were paid for the provision they had given us, by deducting a corresponding sum from their debts; in the same way we gave a reward of sixteen skins of beaver to each of the persons who had come to our relief at Fort Enterprise. As the debts of

Akaitcho and his hunters had been effaced at the time of his engagement with us, we placed a sum, equal to the amount of provision they had recently supplied, to their credit on the Company's books. These things being, through the moderation of the Indians, adjusted with an unexpected facility, we gave them a keg of mixed liquors, (five parts water,) and distributed among them several fathoms of tobacco, and they retired to their tents to spend the night in merriment.

Adam, our interpreter, being desirous of uniting himself with the Copper Indians, applied to me for his discharge, which I granted, and gave him a bill on the Hudson's Bay Company for the amount of his wages. These arrangements being completed, we prepared to cross the lake.

Mr. Weeks provided Dr. Richardson and me with a cariole each, and we set out at eleven A.M., on the 15th, for Moose-deer Island. Our party consisted of Belanger, who had charge of a sledge, laden with the bedding, and drawn by two dogs, our two cariole men, Benoit, and Augustus. Previous to our departure, we had another conference with Akaitcho, who, as well as the rest of his party, bade us farewell, with a warmth of manner rare among the Indians.

The badness of Belanger's dogs, and the roughness of the ice, impeded our progress very much, and obliged us to encamp early. We had a good fire made of the drift wood, which lines the shores of this lake in great quantities. The next day was very cold. We began the journey at nine A.M., and encamped at the Big Cape, having made another short march, in consequence of the roughness of the ice.

On the 17th, we encamped on the most southerly of the Reindeer Islands. This night was very stormy, but the wind abating in the morning, we proceeded, and by sunset reached the fishing-huts of the Company at Stony Point. Here we found Mr. Andrews, a clerk of the Hudson's Bay Company, who regaled us with a supper

of excellent white fish, for which this part of Slave Lake is particularly celebrated. Two men with sledges arrived soon afterwards, sent by Mr. M'Vicar, who expected us about this time. We set off in the morning before day-break, with several companions, and arrived at Moose-deer Island about one P.M. Here we were received with the utmost hospitality by Mr. M'Vicar, the chief trader of the Hudson's Bay Company in this district, as well as by his assistant, Mr. M'Auley. We had also the happiness of joining our friend, Mr. Back; our feelings on this occasion can be well imagined, we were deeply impressed with gratitude to him for his exertions in sending the supply of food to Fort Enterprise, to which, under Divine Providence, we felt the preservation of our lives to be owing. He gave us an affecting detail of the proceedings of his party since our separation; the substance of which I shall convey to the reader, by the following extracts from his Journal.

Mr. BACK's NARRATIVE.

1821. October 4. Mr. Franklin having directed me to proceed with St. Germain, Belanger, and Beauparlant, to Fort Enterprise, in the hope of obtaining relief for the party, I took leave of my companions, and set out on my journey, through a very swampy country, which, with the cloudy state of the weather, and a keen north-east wind, accompanied by frequent snow showers, retarded us so much, that we scarcely got more than four miles, when we halted for the night, and made a meal of *tripe de roche* and some old leather.

On the 5th, we set out early, amidst extremely deep snow, sinking frequently in it up to the thighs, a labour in our enfeebled and almost worn out state, that nothing but the cheering hopes of reaching the house, and affording relief to our friends, could have enabled us to

support. As we advanced, we found to our mortification, that the *tripe de roche*, hitherto our sole dependence, began to be scarce, so that we could only collect sufficient to make half a kettleful, which, with the addition of a partridge each, that St. Germain had killed, made us a tolerable meal; during this day I felt very weak and sore in the joints, particularly between the shoulders. At night we encamped among a small clump of willows.

On the 6th we set out at an early hour, pursuing our route over a range of hills, at the foot of one of which we saw several large pines, and a great quantity of willows; a sight that encouraged us to quicken our pace, as we were now certain we could not be far from the woods. Indeed we were making considerable progress, when Belanger unfortunately broke through the ice, and sunk up to the hips. The weather being cold, he was in danger of freezing, but some brushwood on the borders of the lake enabled us to make a fire to dry him. At the same time we took the opportunity of refreshing ourselves with a kettle of swamp tea.

My increasing debility had for some time obliged me to use a stick for the purpose of extending my arms; the pain in my shoulders being so acute, that I could not bear them to remain in the usual position for two minutes together. We halted at five among some small brushwood, and made a sorry meal of an old pair of leather trowsers, and some swamp tea.

The night was cold with a hard frost, and though two persons slept together, yet we could not by any means keep ourselves warm, but remained trembling the whole time. The following morning we crossed several lakes, occasionally seeing the recent tracks of deer, and at noon we fell upon Marten Lake; and it happened to be the exact spot where we had been the last year with the canoes, and though I immediately recognised the place, the men would not believe it to be the same; at length, by pointing out several marks, and relating circumstances connected with them, they recovered

their memory, and a simultaneous expression of "Mon Dieu, nous sommes sauvés," broke out from the whole. Contrary to our expectations, the lake was frozen sufficiently to bear us, so that we were excused from making the tours of the different bays. This circumstance seemed to add fresh vigour to us, and we walked as fast as the extreme smoothness of the ice would permit, intending to reach the Slave Rock that night; but an unforeseen and almost fatal accident prevented the prosecution of our plan: Belanger (who seemed the victim of misfortune) again broke through the ice, in a deep part near the head of the rapid, but was timely saved, by fastening our worsted belts together, and pulling him out. By urging him forwards as quick as his icy garments would admit of, to prevent his freezing, we reached a few pines, and kindled a fire; but it was late before he even felt warm, though he was so near the flame as to burn his hair twice, and to add to our distress three wolves crossed the lake close to us.

The night of the 7th was extremely stormy, and about ten the following morning, on attempting to go on, we found it totally impossible, being too feeble to oppose the wind and drift, which frequently blew us over, and on attempting to cross a small lake that lay in our way, drove us faster backwards than under all advantages we could get forwards; therefore we encamped under the shelter of a small clump of pines, secure from the south-west storm that was raging around us. In the evening, from there being no *tripe de roche*, we were compelled to satisfy, or rather allay, the cravings of hunger, by eating a gun cover and a pair of old shoes; at this time I had scarcely strength to get on my legs.

The wind did not in the least abate during the night, but in the morning of the 9th it changed to north-east, and became moderate. We took advantage of this circumstance, and rising with great difficulty, set out, though had it not been for the hope of reaching the house, I am certain, from the excessive faintness which almost

overpowered me, that I must have remained where I was. We passed the Slave Rock, and making frequent halts, arrived within a short distance of Fort Enterprise; but as we perceived neither any marks of Indians, nor even of animals, the men began absolutely to despair: on a nearer approach, however, the tracks of large herds of deer, which had only passed a few hours, tended a little to revive their spirits, and shortly after we crossed the ruinous threshold of the long-sought-for spot; but what was our surprise, what our sensations, at beholding every thing in the most desolate and neglected state: the doors and windows of that room in which we expected to find provision, had been thrown down, and carelessly left so; and the wild animals of the woods had resorted there, as to a place of shelter and retreat. Mr. Wentzel had taken away the trunks and papers, but had left no note to guide us to the Indians. This was to us the most grievous disappointment: without the assistance of the Indians, bereft of every resource, we felt ourselves reduced to the most miserable state, which was rendered still worse, from the recollection that our friends in the rear were as miserable as ourselves. For the moment, however, hunger prevailed, and each began to gnaw the scraps of putrid and frozen meat that were laying about, without waiting to prepare them. A fire, however, was made, and the neck and bones of a deer, found lying in the house, were boiled and devoured.

I determined to remain a day here to repose ourselves, and then to go in search of the Indians, and in the event of missing them, to proceed to the first trading establishment, which was distant about one hundred and thirty miles, and from thence to send succour to my companions. This indeed I should have done immediately, as the most certain manner of executing my purpose, had there been any probability of the river and lakes being frozen to the southward, or had we possessed sufficient strength to have clambered over the rocks and mountains which impeded the direct way; but as we

were aware of our inability to do so, I listened to St. Germain's proposal, which was, to follow the deer into the woods, (so long as they did not lead us out of our route to the Indians,) and if possible to collect sufficient food to carry us to Fort Providence. We now set about making mittens and snow shoes, whilst Belanger searched under the snow, and collected a mass of old bones, which when burned and used with a little salt, we found palatable enough, and made a tolerable meal. At night St. Germain returned, having seen plenty of tracks, but no animals; the day was cloudy, with fresh breezes, and the river was frozen at the borders.

On the 11th we prepared for our journey, having first collected a few old skins of deer, to serve us as food, and written a note to be left for our commander, to apprize him of our intentions. We pursued the course of the river to the lower lake, when St. Germain fell in, which obliged us to encamp directly to prevent his being frozen; indeed we were all glad of stopping, for in our meagre and reduced state it was impossible to resist the weather, which at any other time would have been thought fine; my toes were frozen, and although wrapped in blanket I could not keep my hands warm.

The 12th was excessively cold with fresh breezes. Our meal at night consisted of scraps of old deer skins and swamp tea, and the men complained greatly of their increasing debility. The following morning I sent St. Germain to hunt, intending to go some distance down the lake, but the weather becoming exceedingly thick with snow storms, we were prevented from moving. He returned without success, not having seen any animals. We had nothing to eat.

In the morning of the 14th the part of the lake before us was quite frozen. There was so much uncertainty in St. Germain's answers as to the chance of any Indians being in the direction we were then going, (although he had previously said that the leader had told him he should be there,) and he gave me so much dissatisfaction in his hunting excursions, that I was induced to send a note to the

Commander, whom I supposed to be by this time at Fort Enterprise, to inform him of our situation; not that I imagined for a moment he could better it, but that by all returning to the fort we might, perhaps, have better success in hunting; with this view I despatched Belanger, much against his inclination, and told him to return as quick as possible to a place about four miles further on, where we intended to fish, and to await his arrival. The men were so weak this day, that I could get neither of them to move from the encampment; and it was only necessity that compelled them to cut wood for fuel, in performing which operation Beauparlant's face became so dreadfully swelled that he could scarcely see; I myself lost my temper on the most trivial circumstances, and was become very peevish; the day was fine but cold, with a freezing north-east wind. We had nothing to eat.

October 15.—The night was calm and clear, but it was not before two in the afternoon that we set out; and the one was so weak, and the other so full of complaints, that we did not get more than three-quarters of a mile from our last encampment, before we were obliged to put up; but in this distance we were fortunate enough to kill a partridge, the bones of which were eaten, and the remainder reserved for baits to fish with. We were fortunate, however, in collecting sufficient *tripe de roche* to make a meal; and I now anxiously awaited Belanger's return, to know what course to take. I was now so much reduced, that my shoulders were as if they would fall from my body, my legs seemed unable to support me, and in the disposition which I then found myself, had it not been for the remembrance of my friends behind, who relied on me for relief, as well as the persons of whom I had charge, I certainly should have preferred remaining where I was, to the miserable pain of attempting to move.

October 16.—We waited until two in the afternoon for Belanger; but not seeing any thing of him on the lake, we set out, purposing

to encamp at the Narrows, the place which was said to be so good for fishing, and where, according to St. Germain's account, the Indians never failed to catch plenty; its distance at most could not be more than two miles. We had not proceeded far before Beauparlant began to complain of increasing weakness. This was so usual with us that no particular notice was taken of it, for in fact there was little difference, all being alike feeble: among other things, he said whilst we were resting, that he should never get beyond the next encampment, for his strength had quite failed him. I endeavoured to encourage him by explaining the mercy of the Supreme Being, who ever beholds with an eye of pity those that seek his aid. This passed as common discourse, when he inquired where we were to put up; St. Germain pointed to a small clump of pines near us, the only place indeed that offered for fuel. "Well," replied the poor man, "take your axe Mr. Back, and I will follow at my leisure, I shall join you by the time the encampment is made." This is a usual practice of the country, and St. Germain and myself went on towards the spot; it was five o'clock and not very cold, but rather milder than we had experienced it for some time, when, on leaving the ice, we saw a number of crows perched on the top of some high pines near us. St. Germain immediately said there must be some dead animal thereabouts, and proceeded to search, when we saw several heads of deer half buried in the snow and ice, without eyes or tongues. The previous severity of the weather only having obliged the wolves and other animals to abandon them. An expression of "Oh merciful God! we are saved," broke from us both; and with feelings more easily imagined than described, we shook hands, not knowing what to say for joy. It was twilight, and a fog was rapidly darkening the surface of the lake, when St. Germain commenced making the encampment; the task was too laborious for me to render him any assistance, and had we not thus providentially found provision, I feel convinced that the next twenty-four hours

would have terminated my existence. But this good fortune, in some measure renovated me for the moment, and putting out my whole strength, I contrived to collect a few heads, and with incredible difficulty carried them singly about thirty paces to the fire.

Darkness stole on us apace, and I became extremely anxious about Beauparlant; several guns were fired, to each of which he answered. We then called out, and again heard his responses though faintly, when I told St. Germain to go and look for him, as I had not strength myself, being quite exhausted. He said, that he had already placed a pine branch on the ice, and he could then scarcely find his way back, but if he went now he should certainly be lost. In this situation I could only hope that as Beauparlant had my blanket, and every thing requisite to light a fire, he might have encamped at a little distance from us.

October 17.—The night was cold and clear, but we could not sleep at all, from the pains of having eaten. We suffered the most excruciating torments, though I in particular did not eat a quarter of what would have satisfied me; it might have been from using a quantity of raw or frozen sinews of the legs of deer, which neither of us could avoid doing, so great was our hunger. In the morning, being much agitated for the safety of Beauparlant, I desired St. Germain to go in search of him, and to return with him as quick as possible, when I would have something prepared for them to eat.

It was, however, late when he arrived, with a small bundle which Beauparlant was accustomed to carry, and with tears in his eyes, told me that he had found our poor companion dead. Dead! I could not believe him. "It is so, Sir," said St. Germain, "after hallooing and calling his name to no purpose, I went towards our last encampment, about three quarters of a mile, and found him stretched upon his back on a sand bank frozen to death, his limbs all extended and swelled enormously, and as hard as the ice that was near him; his bundle was behind him, as if it had rolled away

when he fell, and the blanket which he wore around his neck and shoulders thrown on one side. Seeing that there was no longer life in him, I threw your covering over him, and placed his snow shoes on the top of it."

I had not even thought of so serious an occurrence in our little party, and for a short time was obliged to give vent to my grief. Left with one person and both of us weak, no appearance of Belanger, a likelihood that great calamity had taken place amongst our other companions, and upwards of seventeen days' march from the nearest Establishment, and myself unable to carry a burden, all these things pressed heavy on me; and how to get to the Indians or to the fort I did not know; but that I might not depress St. Germain's spirits, I suppressed the feelings which these thoughts gave rise to, and made some arrangements for the journey to Fort Providence. We continued very weak.

October 18.—While we were this day occupied in scraping together the remains of some deer's meat, we observed Belanger coming round a point apparently scarcely moving. I went to meet him, and made immediate inquiries about my friends. Five, with the Captain, he said, were at the house, the rest were left near the river, unable to proceed; but he was too weak to relate the whole. He was conducted to the encampment, and paid every attention to, and by degrees we heard the remainder of his tragic tale, at which the interpreter could not avoid crying. He then gave me a letter from my friend the Commander, which indeed was truly afflicting. The simple story of Belanger I could hear, but when I read it in another language, mingled with the pious resignation of a good man, I could not sustain it any longer. The poor man was much affected at the death of our lamented companion, but his appetite prevailed over every other feeling; and, had I permitted it, he would have done himself an injury; for after two hours' eating, principally skin and sinews, he complained of hunger. The

day was cloudy, with snow and fresh breezes from the north-east by east.

The last evening, as well as this morning, the 19th, I mentioned my wishes to the men, that we should proceed towards Rein-Deer Lake, but this proposal met with a direct refusal. Belanger stated his inability to move, and St. Germain used similar language; adding, for the first time, that he did not know the route, and that it was of no use to go in the direction I mentioned, which was the one agreed upon between the Commander and myself. I then insisted that we should go by the known route, and join the Commander, but they would not hear of it; they would remain where they were until they had regained their strength; they said I wanted to expose them again to death *(faire perir)*. In vain did I use every argument to the contrary, for they were equally heedless to all. Thus situated, I was compelled to remain, and from this time to the 25th we employed ourselves in looking about for the remnants of the deer and pieces of skin, which even the wolves had left; and by pounding the bones, we were enabled to make a sort of soup, which strengthened us greatly, though each still complained of weakness. It was not without the greatest difficulty that I could restrain the men from eating every scrap they found, though they were well aware of the necessity there was of being economical in our present situation, and to save whatever they could for our journey; yet they could not resist the temptation, and directly my back was turned they seldom failed to snatch at the nearest piece to them, whether cooked or raw it made no difference.

We had set fishing-lines, but without any success; and we often saw large herds of deer crossing the lake at full speed, and wolves pursuing them.

The night of the 25th was cold, with hard frost. Early the next morning I sent the men to cover the body of our departed companion Beauparlant with the trunks and branches of trees, which they

did; and shortly after their return I opened his bundle, and found it contained two papers of vermilion, several strings of beads, some fire-steels, flints, awls, fish-hooks, rings, linen, and the glass of an artificial horizon. My two men began to recover a little as well as myself, though I was by far the weakest of the three; the soles of my feet were cracked all over, and the other parts were as hard as horn, from constant walking. I again urged the necessity of advancing to join the Commander's party, but they said they were not yet sufficiently strong.

On the 27th we discovered the remains of a deer, on which we feasted. The night was unusually cold, and ice formed in a pint-pot within two feet of a fire. The coruscations of the Aurora were beautifully brilliant; they served to shew us eight wolves, which we had some trouble to frighten away from our collection of deer's bones; and, with their howling, and the constant cracking of the ice, we did not get much rest.

Having collected with great care, and by self-denial, two small packets of dried meat or sinews, sufficient (for men who knew what it was to fast) to last for eight days at the rate of one indifferent meal per day, we prepared to set out on the 30th. I calculated that we should be about fourteen days in reaching Fort Providence; and, allowing that we neither killed deer nor found Indians, we could but be unprovided with food six days, and this we heeded not whilst the prospect of obtaining full relief was before us. Accordingly we set out against a keen north-east wind, in order to gain the known route to Fort Providence. We saw a number of wolves and some crows on the middle of the lake, and supposing such an assembly was not met idly, we made for them, and came in for a share of a deer, which they had killed a short time before, and thus added a couple of meals to our stock. By four P.M. we gained the head of the lake, or the direct road to Fort Providence, and some dry wood being at hand, we encamped; by accident it was the same

place where the Commander's party had slept on the 19th, the day on which I supposed they had left Fort Enterprise; but the encampment was so small, that we feared great mortality had taken place amongst them; and I am sorry to say the stubborn resolution of my men, not to go to the house, prevented me from determining this most anxious point, so that I now almost dreaded passing their encampments, lest I should see some of our unfortunate friends dead at each spot. Our fire was hardly kindled when a fine herd of deer passed close to us. St. Germain pursued them a short distance, but with his usual want of success, so that we made a meal off the muscles and sinews we had dried, though they were so tough that we could scarcely cut them. My hands were benumbed throughout the march, and we were all stiff and fatigued. The marching of two days weakened us all very much, and the more so on account of our exertion to follow the tracks of our Commander's party; but we lost them, and concluded that they were not before us. Though the weather was not cold, I was frozen in the face, and was so reduced and affected by these constant calamities, as well in mind as in body, that I found much difficulty in proceeding even with the advantages I had enjoyed.

November 3.—We set out before day, though, in fact, we were all better adapted to remain, from the excessive pain which we suffered in our joints, and proceeded till one P.M., without halting, when Belanger, who was before, stopped, and cried out, "Footsteps of Indians." It is needless to mention the joy that brightened the countenances of each at this unlooked-for sight; we knew relief must be at hand, and considered our sufferings at an end. St. Germain inspected the tracks, and said that three persons had passed the day before; and that he knew the remainder must be advancing to the southward, as it was customary with Indians, when they sent to the trading establishment on the first ice. On this information we encamped, and, being too weak to walk myself,

I sent St. Germain to follow the tracks, with instructions to the Chief of the Indians to provide immediate assistance for such of our friends who might be at Fort Enterprise, as well as for ourselves, and to lose no time in returning to me. I was now so exhausted, that had we not seen the tracks this day, I had determined on remaining at the next encampment, until the men could have sent aid from Fort Providence. We had finished our small portion of sinews, and were preparing for rest, when an Indian boy made his appearance with meat. St. Germain had arrived before sunset at the tents of Akaitcho, whom he found at the spot where he had wintered last year; but imagine my surprise, when he gave me a note from the Commander, and said, that Benoit and Augustus, two of the men, had just joined them. The note was so confused, by the pencil marks being partly rubbed out, that I could not decipher it clearly; but it informed me, that he had attempted to come with the two men, but finding his strength inadequate to the task, he relinquished his design, and returned to Fort Enterprise, to await relief with the others. There was another note for the gentleman in charge of Fort Providence, desiring him to send meat, blankets, shoes, and tobacco. Akaitcho wished me to join him on the ensuing day, at a place which the boy knew, where they were going to fish; and I was the more anxious to do so, on account of my two companions: but particularly to hear a full relation of what had happened, and of the Commander's true situation, which I suspected to be much worse than he had described.

In the afternoon I joined the Indians, and repeated to Akaitcho what St. Germain had told him; he seemed much affected, and said, he would have sent relief directly, though I had not been there; indeed, his conduct was generous and humane. The next morning, at an early hour, three Indians, with loaded sledges of meat, skins, shoes, and a blanket, set out for Fort Enterprise; one of them was to return directly with an answer from Captain Franklin,

to whom I wrote; but in the event of his death, he was to bring away all the papers he could find; and he promised to travel with such haste, as to be able to return to us on the fourth day. I was now somewhat more easy, having done all in my power to succour my unfortunate companions; but was very anxious for the return of the messenger. The Indians brought me meat in small quantities, though sufficient for our daily consumption; and, as we had a little ammunition, many were paid on the spot for what they gave.

On the 9th I had the satisfaction of seeing the Indian arrive from Fort Enterprise. At first he said they were all dead, but shortly after he gave me a note, which was from the Commander, and then I learned all the fatal particulars which had befallen them. I now proposed that the Chief should immediately send three sledges, loaded with meat, to Fort Enterprise, to make a *cache* of provision at our present encampment, and also, that he should here await the arrival of the Commander. By noon two large trains, laden with meat, were sent off for Fort Enterprise. The next day we proceeded on our journey, and arrived at Fort Providence on the 21st of November.

Conclusion of Mr. Back's Narrative.

I HAVE little now to add to the melancholy detail into which I felt it proper to enter; but I cannot omit to state, that the unremitting care and attentions of our kind friends, Mr. M'Vicar and Mr. M'Auley, together with the improvement of our diet, materially contributed to the restoration of our health; so that, by the end of February, the swellings of our limbs, which had returned upon us, had entirely subsided, and we were able to walk to any part of the island. Our appetites gradually moderated, and we nearly regained our ordinary state of body before the spring. Hepburn alone suffered from a severe attack of rheumatism, which confined him to his bed for some weeks. The usual symptoms of spring having appeared, on the 25th of May we prepared to embark for Fort Chipewyan. Fortunately, on the following morning, a canoe arrived from that place with the whole of the stores which we required for the payment of Akaitcho and the hunters. It was extremely gratifying to us to be thus enabled, previous to our departure, to make arrangements respecting the payment of our late Indian companions; and the more so, as we had recently discovered that Akaitcho, and the whole of the tribe, in consequence of the death of the leader's mother, and the wife of our old guide Keskarrah, had broken and destroyed every useful article belonging to them, and that they were in the greatest distress. It was an additional pleasure to find our stock of ammunition was more than sufficient to pay them what was due, and that we could make a considerable present of this most essential article to every individual that had been attached to the Expedition.

We quitted Moose-deer Island at five P.M., on the 26th, accompanied by Mr. M'Vicar and Mr. M'Auley, and nearly all the voyagers at the establishment, having resided there about five months, not a day of which had passed without our having cause of gratitude, for the kind and unvaried attentions of Mr. M'Vicar and Mr. M'Auley. These gentlemen accompanied us as far as Fort

Chipewyan, where we arrived on the 2d of June; here we met Mr. Wentzel, and the four men, who had been sent with him from the mouth of the Copper-Mine River; and I think it due to that gentleman, to give his own explanation of the unfortunate circumstances which prevented him from fulfilling my last instructions, respecting the provisions to have been left for us at Fort Enterprise *.

* "After you sent me back from the mouth of the Copper-Mine River, and I had overtaken the Leader, Guides, and Hunters, on the fifth day, leaving the sea-coast, as well as on our journey up the River, they always expressed the same desire of fulfilling their promises, although somewhat dissatisfied at being exposed to privation while on our return, from a scarcity of animals; for, as I have already stated in my first communication from Moose-Deer Island, we had been eleven days with no other food but *tripe de roche*. In the course of this time an Indian, with his wife and child, who were travelling in company with us, were left in the rear, and are since supposed to have perished through want, as no intelligence had been received of them at Fort Providence in December last. On the seventh day after I had joined the Leader, *&c. &c.*, and journeying on together, all the Indians, excepting Petit Pied and Bald-Head, left me to seek their families, and crossed Point Lake at the Crow's Nest, where Humpy had promised to meet his brother Ekehcho * with the families, but did not fulfil, nor did any of my party of Indians know where to find them; for we had frequently made fires to apprize them of our approach, yet none appeared in return as answers. This disappointment, as might be expected, served to increase the ill-humour of the Leader and party, the brooding of which (agreeably to Indian custom) was liberally discharged on me, in bitter reproach for having led them from their families, and exposed them to dangers and hardships, which but for my influence, they said, they might have spared themselves. Nevertheless, they still continued to profess the sincerest desire of meeting your wishes in making caches of provisions, and remaining until a late season on the road that leads from Fort Enterprise to Fort Providence, through which the Expedition-men had travelled so often the year before—remarking, however, at the same time, that they had not the least hopes of ever seeing one person return from the Expedition. These alarming fears I never could persuade them to dismiss from their minds; they always sneered at what they called 'my credulity.'—'If,' said the Gros Pied †, 'the Great Chief (meaning Captain Franklin), or any of his party, should pass at my tents, he or they shall be welcome to all my provisions, or any thing else that I may have.' And I am sincerely happy to understand, by your com-

* Akaitcho the Leader. † Also Akaitcho.

In a subsequent conversation he stated to me, that the two Indians, who were actually with him at Fort Enterprise, whilst he remained there altering his canoe, were prevented from hunting, one by an accidental lameness, the other by the fear of meeting alone some of the Dog-Rib Indians.

We were here furnished with a canoe by Mr. Smith, and a bowman, to act as our guide; and having left Fort Chipewyan on the 5th, we arrived, on the 4th of July, at Norway House. Finding,

munication, that in this he had kept his word—in sending you with such promptitude and liberality the assistance your truly dreadful situation required. But the party of Indians, on whom I had placed the utmost confidence and dependance, was Humpy and the White Capot Guide, with their sons, and several of the discharged hunters from the Expedition. This party was well-disposed, and readily promised to collect provisions for the possible return of the Expedition, provided they could get a supply of ammunition from Fort Providence; for when I came up with them they were actually starving, and converting old axes into ball, having no other substitute—this was unlucky. Yet they were well inclined, and I expected to find means at Fort Providence to send them a supply, in which I was, however, disappointed, for I found that establishment quite destitute of necessaries; and then, shortly after I had left them, they had the misfortune of losing three of their hunters, who were drowned in Martin Lake: this accident was, of all others, the most fatal that could have happened—a truth which no one, who has the least knowledge of the Indian character, will deny; and as they were nearly connected by relationship to the Leader, Humpy, and White Capot Guide, the three leading men of this part of the Copper Indian Tribe, it had the effect of unhinging (if I may use the expression) the minds of all these families, and finally destroying all the fond hopes I had so sanguinely conceived of their assisting the Expedition, should it come back by the Annadessé River, of which they were not certain.

"As to my not leaving a letter at Fort Enterprise, it was because, by some mischance, you had forgot to give me paper when we parted *.

"I however wrote this news on a plank, in pencil, and placed it in the top of your former bedstead, where I left it. Since it has not been found there, some Indians must have gone to the house after my departure, and destroyed it. These details, Sir, I have been induced to enter into (rather unexpectedly) in justification of myself, and hope it will be satisfactory."

* I certainly offered Mr. Wentzel some paper when he quitted us, but he declined it, having then a note-book; and Mr. Back gave him a pencil.

at this place, that canoes were about to go down to Montreal, I gave all our Canadian voyagers their discharges, and sent them by those vessels, furnishing them with orders on the Agent of the Hudson's Bay Company, for the amount of their wages. We carried Augustus down to York Factory, where we arrived on the 14th of July, and were received with every mark of attention and kindness by Mr. Simpson, the Governor, Mr. M'Tavish, and, indeed, by all the officers of the United Companies. And thus terminated our long, fatiguing, and disastrous travels in North America, having journeyed by water and by land (including our navigation of the Polar Sea,) five thousand five hundred and fifty miles.

END OF THE NARRATIVE.

APPENDIX.

No. I.

GEOGNOSTICAL OBSERVATIONS,

BY JOHN RICHARDSON, M. D.,

AND SURGEON TO THE EXPEDITION.

IN the following paper I have aimed merely at a very general account of the different rock formations that presented themselves on the line of our journey. To have given a satisfactory account of the structure of so large an extent of country, would have required not only a much better acquaintance with geognosy than I can lay any claim to, but that I should have turned my undivided attention to that object. Whilst we travelled in canoes, which includes the greatest part of our journey, and nearly the whole of the season in which the ground was uncovered, my opportunities of making collections in Natural History were limited to the short halts it was necessary to make for the needful refreshment or repose of the men—a further delay being incompatible with the attainment of the main object of the Expedition. The want of opportunity for observation it was impossible to remedy, but I was desirous of compensating for my own inexperience in geognosy, by making as extensive a collection of specimens as circumstances would permit. Beyond Fort Enterprise, however, the want of means of transport prevented me from even making an attempt at collection. Those specimens that were obtained to the southward of that place have been submitted to the inspection of Professor Jameson, and I feel happy in an opportunity of acknowledging a small part of my obligations to that distinguished mineralogist. His zeal for the promotion of science led him to take an early and deep interest in our proceedings, and his endeavours to serve us have been unwearied.

The western shores of Hudson's Bay between the 56 and 58 parallels of

latitude are flat, and the depth of the sea decreases very gradually on approaching them. In seven fathoms of water the tops of the trees are just visible from a ship's deck. Large boulder stones strew the beach, and form shoals, even at the distance of five miles from the shore, which are very hazardous to boats. Nearly in the centre of this district, Nelson's and Hayes' Rivers pour their waters together into the bay. The former is a mighty stream, and carries off the waters from a vast extent of country. The Saskatchawan, its principal branch, rises by two heads in the Rocky Mountains, one adjoining the sources of the Missouri and Columbia*, and the other near the heads of the Elk, Caledonia, and Peace Rivers. As these rivers diverging nearly at right angles, flow into the four bounding seas, it is more than probable that the Saskatchawan originates in the loftiest height of land in North America.

Red River, another of the branches of Nelson River, has a source far inferior to that of the Saskatchawan in altitude, but remarkable as being in the same height of land from whence the Mississippi† and St. Lawrence derive their origin. The altitude of this latter height has been calculated by Mr. Schoolcraft at one thousand three hundred and sixty feet above the Atlantic‡.—By Split Lake and the chain of lakes communicating with it, and by Beaver Lake and its chain of waters, Nelson River receives supplies from the very banks of the Missinippi§ or Churchill River. Indeed, the Beaver Lake chain which lay in our route, originates within a hundred yards of the latter stream. A consideration of these circumstances will give a pretty correct notion of the general declination of a large extent of country.

Hayes' River, although it pours out a considerable body of water, traverses a district which appears very small when compared with the one just mentioned. It is separated from Nelson River at its mouth by a low point of alluvial land, upon which, at the distance of five or six miles from the sea, York Factory stands.

* Specimens of agates and calcedonies, collected near the source of the Colombia, by Mr. M'Kenzie, one of the chief factors of Hudson's Bay Company, have been probably washed from amygdaloidal rocks.

† Meessee seepee, great river.

‡ Schoolcraft's Narrative of Governor Cass's Expedition.

§ Meessee or Meectchee-neepee, much water.

The surrounding country, and the banks of the river as far as the junction of the Shamattawa, fifty miles from the sea, has a low uniform swampy appearance. Immediately under a thin stratum of half-decayed mosses, there is a thick bed of tenacious and somewhat slaty bluish clay, containing many boulder stones. As the stream is continually encroaching upon some points, and depositing its spoils on others, its banks are alternately steep and shelving, but the bed of the river is in general from thirty to forty feet below the level of the adjoining ground. The soil nourishes a pretty thick forest, but the trees, consisting chiefly of spruces, larches, and poplars *, are small except in very favourable situations. Slips of the banks are frequent, and the trees either retain their erect position or lie in various directions athwart the stream, and seem to thrive in both conditions until cut down by the ice in the spring floods. It is worthy of remark that the sub-soil is perpetually frozen. This retains the surface water, and converts the country into a swamp in which sphagna and other mosses grow, but owing to the shortness of summer they decay very slowly, and little peat is formed. The surface is still hard when the smaller plants, under the powerful influence of an almost midsummer sun, begin to flower; and by the middle of September, when the heat has penetrated the farthest into the earth, the leaves are falling. In a favourable summer the ground is thawed to the depth of four feet, but there still remains a frozen bed, whose thickness we had not an opportunity of ascertaining by personal observation, although we were informed by the residents that it exceeds eleven feet, and that underneath there is loose sand.

We did not observe the ground permanently frozen any where in the interior; and its occurrence at York Factory ought, perhaps, to be attributed to the vicinity of the sea. A frozen ocean can contribute nothing towards tempering the severity of winter, but the ice which hangs upon these shores generally to the middle of August, must have a powerful effect in diminishing the summer heat; hence the warmest summers on the American continent, between the 55 and 65 parallels of north latitude, are to be looked for at the greatest distance from the sea: accordingly we find that vegetation is much more active even on the elevated range of the Rocky Mountains than it is on the same parallel on the shore of Hudson's Bay. The same rule does not apply to both sides of the American continent, for, to the westward of the Rocky

* Pinus alba, nigra et microcarpa; Populus trepida et balsamifera.

Mountains, the winter, ameliorated by an open sea, is much milder than to the eastward, and this difference is likely to be permanent: because the current setting through Behring's Straits, and along the northern shores of the continent, must continue to bring down annually large bodies of ice to the east coast, to be detained there in the winding passages of a vast archipelago, and in bays and inland seas for the summer. It may be proper to remark that this accumulation of ice principally operates on the temperature of summer, and has only a remote effect in increasing the cold of winter; but that it is upon the heat of the former season, that vegetation entirely depends in these northern climates.

Returning after this digression to Hayes River, we may state that the boulders which obstruct its channels and line its banks, shew that there occur in its *river district* rocks of the *primitive* class, as red granite, hornblende rock, gneiss, and sienite; of the *transition* class, as grey wacke; and of the *secondary class*, as red sandstone, belonging most probably to the new red sandstone formation, under which we include the rothliegende and the variegated sandstone; and two kinds of limestone, one having a bluish-grey colour, splintery fracture, glimmering lustre, and translucent edges; the other resembling marl, and having a yellowish-grey colour, an earthy fracture, and being dull and opaque.

The limestones appear to belong to the same or a similar formation with the vast beds, to be hereafter mentioned in our account of the Saskatchawan and Elk Rivers, and to have been brought down by the Shamattawa, on whose banks it is said to form high cliffs. Indeed a low ridge of this sort of limestone, about twenty miles wide, seems to run from the northward of Churchill to Severn River, at the distance of thirty or forty miles from the sea-shore, and nearly parallel to it*.

The principal branch of Hayes River above the Shamattawa is named Steel River. The banks of this stream have the same general character with those of Hayes River, but their elevation is greater although they shelve more gradually down to the water. Steel River is formed of two branches of nearly equal size, named Fox and Hill Rivers. The former flows from the N.W., and it is most probable that fragments of grey wacke, which we observed on the banks of Hayes River, came from that source, as we found no traces of the

* See Mr. Auld, Transactions of the Geological Society, vol. v. p. 2.

transition series on Hill River, the other branch and the one through which our route lay.

In the lower parts of Hill River the banks are composed nearly of the same materials as those in Hayes and Steel Rivers, but they rise more precipitously from the very narrow channel of the river to an elevation of nearly two hundred feet. Their outline, too, is more varied, being broken into conical eminences by numerous ravines which open into the river at right angles. Many steep cliffs, sections of these eminences, and of course of a conical form, have their bases washed by the streams; one of the most remarkable is named the Sugar Loaf. The banks being exactly similar in form and constituent parts to those which occur on Lake Winipeg and the Saskatchawan on the confines of the limestone formation there, I am inclined to believe that this part of Hill River cuts the western boundary of the other limestone district, which has been spoken of as running parallel to the coast. We did not observe, however, any of the solid strata in the bed of the river, although the clay on the banks contained many imbedded fragments of the stone, as well as much calcareous matter intimately blended with it.

About a mile below the Rock Portage, or ninety-nine miles from the sea, (including the windings of the river course) rocks *in situ* first occur. They consist of gneiss, and rise in the channel of the river from under the lofty clay banks which still continue.

The gneiss formation appears to extend from this place to Lake Winipeg, and to contain subordinate beds and veins of granite, beds of hornblende, rock, and mica slate, which we shall enumerate in the order in which they occurred on our route. The general direction of the strata appears to be from NE to SW, but our opportunities of observation were too limited to decide this fact.

At the Rock Portage a ridge of gneiss, crossing the stream obliquely, forms a chain of small islands, and produces several cascades. The gneiss at this spot is intersected in every direction by veins of quartz, and there is but little mica disseminated through it, the greatest part of this mineral being confined to kidneys, which are insensibly blended with the enclosing rock. The great number of the veins, their intricate ramifications, and reunions, viewed in conjunction with the different portions of the rock very dissimilar to each other, but uniting together by imperceptible gradations, seem to

mark that the whole of this bed of rock is of cotemporaneous origin. Hand specimens from one part of the rock might be denominated quartz rock, from another, mica slate.

After passing the Rock Portage, the clayey banks gradually decrease in height, and in the upper parts of the river they entirely disappear, and the gneiss rises into small ridges on the borders of the stream, and forms numerous islands in the small lakes into which the river expands, or rather through which it flows. Whilst the clay continues the country is well clothed with wood, but afterwards, for want of soil the trees are in general stunted. The bed of the river is every where uneven, and composed of strata of rock, which are divided by deep fissures into irregular lozenge-formed masses.

At the point of rocks four miles above the Rock Portage, a grey gneiss occurs containing much mica, and intersected by veins of quartz. And five miles further on, there are several detached conical hills; the highest having an altitude of about six hundred feet, is named the Hill, and is the origin of the appellation of the river. From the summit of the Hill thirty-five lakes are said to be visible; indeed, all the valleys seem to be filled with water, the almost insulated summits of the hills and ridges being alone visible. We had no opportunity of visiting these hills.

A few miles above the Hill, at the Lower Burntwood Portage, a vein of granite was observed crossing the gneiss, and a similar vein occurs about one quarter of a mile higher up the river. At Morgan's Rocks the exposed bed of rock appears to be granitic gneiss, and at the Upper Burntwood Carrying Place half a mile farther on, there is a bed of hornblende rock and another of a red granite which is composed of red felspar, grey quartz, and very little mica.

At the Swampy Portage there is a bed of red felspar, containing small disseminated grains of epidote—and at the Upper Portage hornblende slate occurs alternating with grey gneiss, slightly intermixed with hornblende, together with beds of quartz rock, containing precious garnets. The direction of the strata here is from east to west, the dip about 80° to the northward.

In Ground-Water Creek, two miles distant, the same kind of hornblende slate is found, having the same dip, and alternating with red granite composed of red felspar, grey quartz, and dark green mica. And at Bird's Lake, and on Sail Island, near the debouchure of Swampy Lake, extensive portions of grey gneiss are exposed, unaccompanied by other rocks. After crossing

Swampy Lake, the river changes its name from Hill to Jack River. At the Lower Portage in Jack River, a red granite occurs ; and at the Long Carrying Place a little higher up, a granitic gneiss, having disseminated iron pyrites, alternates with a compact grey micaceous gneiss. The strata of gneiss are much contorted at their line of junction with the granite ; but their general line of direction is north and south, and they apparently dip to the eastward. At the Upper Portage, the strata of grey gneiss have a direction from E.S.E. to W.N.W. and a northerly dip, but they are much convoluted and contorted. They contain a bed of primitive greenstone, having disseminated iron pyrites. This greenstone contains diallage, and is therefore passing into diallage rock. The rocks in Jack River are low, and sparingly covered with soil ; the woods thin, and the surrounding country flat, and destitute even of the moderate elevations which occur in Hill River.

The borders of Knee Lake presented the same appearances that were observed in Jack River. In one place, which we were induced to examine from the unusual luxuriance of the trees, the soil was very thin ; but the subjacent rock consisted of primitive greenstone, with disseminated iron pyrites. This rock, situated about fifteen miles from the lower end of the lake, forms a low cliff which has somewhat of a columnar structure. Nine miles farther, vertical strata of mica slate rising a little above the water, formed a number of smooth flat islands. The direction of its strata was E.N.E. and W.S.W. The magnetic islet near the *knee* of the lake, referred to in page 36 of the Narrative, is composed of the same rock highly impregnated with magnetic iron ore, and having its thin layers alternating with layers of that mineral. The strata of this islet are vertical, and very much undulated in direction. The gneiss rose on the borders of the lake into roundish eminences, whilst the mica slate formed even islands scarcely appearing above the water. At the upper end of the lake the gneiss exposed is grey and compact.

The same rock was observed in Trout River (the name which the stream now assumes), and half a mile above the Lower Carrying Place it was found impregnated with magnetic iron ore. The strata have a direction from E.S.E. to W.N.W.—the dip, if any, is to the north. At the second portage, in Trout River, the bed of the river is formed of vertical mica slate, whose thin layers lacerating the boatmen's feet, have obtained for it the name of Knife-edge Portage. At the third portage, the ground is strewed with large boulder

stones of grey gneiss, containing well crystallized precious garnets. At the Upper Carrying-Place, mica slate occurs, and half a mile above it vertical strata of gneiss appear, its layers alternating with layers of magnetic iron ore.

An island, near the centre of Holy Lake, is composed of chlorite, and mica slates. At the upper end of Holy Lake, the designation of the river is changed to Weepinapannis. This stream flows through a marshy country, and is divided by low barren rounded masses of rock into a great variety of channels.

At the Lower Portage, in the Weepinapannis, granitic and hornblendic gneiss occur, the former intersected by a vein of red granite.—Moore's Island is composed of a bed of granite. Half a mile above it, the rocks consisting of granitic gneiss are intersected by a vein of red granite. The direction of the strata here is N.E. b. E. and S.W. b. W.—Near the Crooked Spout, hornblendic gneiss alternates with porphyritic granitic gneiss, and red granite passing into gneiss.

At the upper end of the small piece of water termed the Windy Lake, the stream, now very much diminished, obtains the name of Rabbit Ground. The rocks here resemble those in the Weepinapannis.

At Hill Gates, the stream runs through a narrow chasm in the rocks, above ten miles long. The predominating rock is grey gneiss, more or less compact, and sometimes inclining to granite, but more often to mica slate. Near the centre of the chasm, the eminences separated by narrow valleys, and composed as it were of rounded masses heaped one upon another, rise to the height of two hundred and fifty feet. The predominating stone here is a granite inclining to gneiss. The stratification of the rocks that bound this chasm is obscurely mantleform.

After leaving Hill Gates we passed through a marshy lake, and arrived at the White Fall, where the stream, rushing through another chasm, forms a succession of cascades. The rocks at this place, consisted of compact grey gneiss containing an extensive bed of graphic granite. Kidneys of a less compact gneiss were contained in the granite.

A shallow swampy piece of water, bounded by gneiss, conducted us from the White Fall to the Painted Stone, where the principal branch of Hill River may be said to originate. The portage at the Painted Stone is made over a low rock of grey gneiss, much intersected with veins of quartz and felspar.

It is only a few yards long, and separates the Echemamis, a rivulet tributary to the Nelson, from one of the sources of Hayes' River.

The Echemamis flows, or rather filters, through a swamp for thirty miles; when, having previously formed a slight expansion termed Hairy Lake, and assumed the name of Blackwater Creek, it terminates in Sea River, one of the arms of the Nelson. This swampy district is traversed by many round-backed ridges of gneiss, having a direction from east to west, and rising to the height of one hundred and fifty feet. Several beds of hornblende slate are enclosed in the gneiss. On Sea River, and in Play-Green Lake, the same rocks were observed. At Sea River Carrying-Place, a granitic gneiss forms a round-backed low ridge, running nearly east and west. It contains some small beds of porphyritic red granite, in which there are included some masses of mica slate; the slate penetrating and intimately mixing with the granite at the line of junction. In Play-Green Lake the gneiss forms many low smooth round-backed islands.

The primitive rocks disappear under the clay, below Norway Point. The north shore of Lake Winipeg is formed into a peninsula by Play-Green Lake and Limestone Bay. It consists of steep clay cliffs, similar to those which preceded the gneiss in Hill River, but containing rather more calcareous matter.—When the lake is low, there is a flat beach betwixt it and these cliffs; but in southerly winds the waves wash their bases. The beach is composed of a fine calcareous sand, and small fragments of water-worn limestone. The same materials form a narrow bank, which running to the S.W. for about eight miles, separates Limestone Bay from the body of the lake. The fragments belong to two kinds of limestone; the one yellowish white and dull with a conchoidal fracture, and translucent edges; the other bluish and yellowish grey, dull, with an earthy fracture and opaque.

We did not observe any rocks of the former kind *in situ* in this neighbourhood*; but cliffs of the latter appear on the west side of Limestone Bay, and continue to bound the lake as far as the mouth of the Saskatchawan, and as we have been informed, down the whole of its western shore.

This limestone, which extends over a vast tract of country, probably belongs to the great series of limestone formations under the green sand, and above the

*A similar rock, however, was found in Pine Island Lake, fifteen miles N.N.E. of Cumberland-House.

new red sandstone. It may in general be characterized as compact, splinty, yellowish-grey limestone. It appears to contain a considerable portion of clay, as most of the varieties adhere to the tongue when newly broken. Perhaps the whole bed owes its origin to shells cemented together by argillaceous matter. Many portions of it are almost entirely composed of bivalve shells; and even the most compact kinds, when long exposed to the weather or to the action of fire, shew traces of shells. It yields readily to the action of the weather, and burns into a very white lime, but requires to be long exposed to the heat.

Its strata are in general horizontal; and where large beds of it are exposed, it is traversed by fissures crossing each other at right angles. When washed by the rivers, too, it tumbles down in large cubical fragments, which soon separate in the direction of the strata into thin layers. This is well exhibited at the *Grand Rapid* near the mouth of the Saskatchawan, where there is a fine section of it.

It may be proper here to take a general view of the extent of this formation; and in so doing, to make a few general remarks upon the districts in which we observed it, or through which we suspect it to extend. We obtained specimens exactly similar to those in Lake Winipeg from Manito-baw Lake, and were informed that it abounds much farther to the southward. In our journey up the Saskatchawan, we traced it to the Neepewan, a distance of three hundred miles, where it is succeeded or covered by calcareous clayey cliffs, similar to those which preceded it on our route.

From this place to the foot of the *Rocky Mountains*, the river flows through a plain of fine sand. Its bed is about two hundred feet below the plain, and it presents almost every where a regular gradation of three distinct banks, shewing the height of the water at former periods. The channel of the river is continually shifting, encroaching on the steep bank on one side, and forming with its alluvia low flat points on the opposite shore.

Between the Neepewan and Carlton, the plains are interspersed with clumps of wood; but above the latter place the dry sandy soil produces only a short grass, which supports numerous herds of buffalo. The newer depositions beneath the high bank contain more vegetable matter, and are covered with willows, and occasionally with aspen trees. These plains are said to extend to the Missouri, and to be interrupted by few hills. Two only of moderate height, and even outline, were observed in the neighbourhood of Carlton, the limit of

our journey in this direction. The older traders relate, that many lakes have dried up on the plains since they first visited the country. The hollows are annually partially filled by the melting snow, but the water filters away, or is evaporated early in the summer. Many ponds or small lakes, however, still remain.

The traders report that they have observed limestone in several of the creeks that flow into the upper parts of the Saskatchawan; and it is probable that the limestone formation not only extends through a vast portion of the plains, but also that it runs parallel to the Rocky Mountains as far as M'Kenzie's River. Captain Franklin observed it on the Beaver River: it exists abundantly and almost exclusively on the Clear Water and Elk Rivers; and we found it again on the islands on the south side of Great Slave Lake. Between this limestone and the Rocky Mountains, rocks of the coal formation exist; beds of coal on fire having been known to the traders for many years on the upper part of the Saskatchawan and on M'Kenzie's River. These were the only circumstances we could gather with regard to the western boundaries of this formation. We touched more than once on its eastern boundary in the course of our journey, but no where had we a good opportunity of observing its geognostical relation to other rocks. The most singular circumstance attending it is the entire exclusion of foreign beds. We never observed it associated with any other rock, except perhaps on Elk River, where it appears in contact with compact earthy marl, and slaggy mineral pitch, or bituminous sandstone; and on the Copper-Mine River, where rolled fragments of a similar stone were found connected with layers of dark flinty slate. The cliffs on the west side of Lake Winipeg are from twenty to thirty feet high; and at the Grand Rapid there is a section of it nearly sixty feet deep. It is here covered with a very thin layer of soil, and its strata-dip to the northward at an angle of 10°.

About Cumberland-House, the country is uniformly flat and swampy, but the rock shews itself frequently above the surface. Its strata here are generally horizontal, but in one place we observed it dipping to northward at an angle of 40°.

About thirty miles to the southward of Cumberland-House there is a round-backed hill, named Basquiau, of considerable altitude, being visible at that distance. It forms a long ridge with an even outline, but we had no opportunity of examining it more nearly. There are several salt springs at its foot,

from which a considerable quantity of salt is annually extracted *. Salt springs and lakes also exist from twelve to twenty miles to the northward of Carlton House, as was ascertained by Captain Franklin in his winter journey; and I obtained a small quantity of a salt which the Indians procure in that neighbourhood, and use as a purgative. They report that in the state of a fine powder, it covers the shores of a small lake in the summer-time to the depth of two or three inches †.

In our voyage in the spring of 1820, we traced the limestone to the north side of Beaver Lake. In Pine Island Lake the strata are in general horizontal. On an island beyond the *fishing place*, fifteen miles N.E. from Cumberland House, the strata dipping east 10°, consist of yellowish-grey, very compact limestone, resembling hornstone. Twelve miles further on, at the portage of the Little Red Rock, near the mouth of Sturgeon-Weir River, a more crystalline limestone is coloured reddish-yellow, by oxide of iron. Its strata dip to the eastward at a very small angle. At the Rat Portage, two miles higher up the river, there is an extensive bed of yellowish-grey and somewhat crystalline limestone, perfectly flat, and splitting readily into thin horizontal slabs. A number of parallel fissures running N.W. and S.E., are crossed in different directions by minor cracks. The bed of Sturgeon-Weir River is every where composed of limestone. It has a considerable descent. On the east and west sides of Beaver Lake, the ground is broken by eminences from a hundred and fifty to two hundred feet high. These consist of a limestone similar to that which occurs at the Rat Portage, sometimes having a yellowish-grey colour, but more generally coloured deep red by oxide of iron. There are many mural precipices amongst these small hills, and also some deep rents or caves, in which the snow remains unmelted the whole summer. On the east side of the lake, near the site of an old fort, the strata dip to the S.W. at an angle of 30°.

About three miles from the mouth of Ridge River, primitive hornblende

* The salt springs, mentioned above in all probability arise from the upper part of the new red sandstone.

† Dr. Fife analyzed a small portion of this salt, which was obtained from an Indian, and found it to be effloresced sulphate of soda. See page 515. The occurrence of so much sulphate of soda is an interesting and remarkable fact; for though it appears more abundantly in colder latitudes than in others, yet there are no accounts of its having been found in such abundance as the Indians report it to be in the place just mentioned.

slate forms a small island. The *primitive strata* which we fell in with here, and traced to Isle-à-la-Crosse Lake, seem to be a continuation of the range we quitted at the south end of Play-Green Lake; and neither at that place nor here could we discover any rocks interposed between them and the limestone. About a mile distant from the above-mentioned island of hornblende slate, cliffs of limestone bound the lake. We had no opportunity of observing the limestone more nearly in contact with other rocks than at this place. The bounding line between the two formations seems to run about W. b. N. from Play-Green Lake to the upper part of Isle-à-la-Crosse Lake. We crossed this boundary line on entering the Ridge River.

At the Ridge Portage, two miles from the mouth of the river, a ridge of mica slate crosses the stream. Its strata dip N.E. at an angle of 45°. From this place up to the junction of Hay River, the mica slate in irregular ridges bounds the stream. Above Hay River, sixteen miles from Beaver Lake, the river is wider and less rapid, and is termed by the Canadian voyagers, *La grande rivière*. Here the mica slate is succeeded by gneiss, which forms irregular roundish eminences, rising a hundred and fifty feet above the water. The gneiss is traversed in every direction by veins of flesh-coloured felspar, and contains many kidneys of mica slate. These rocks are very sparingly covered with soil, and consequently support few trees. At the Carp Portage *, fifteen miles N.W. b. N. of the Ridge Portage, there occurs a light red-coloured rock, composed of felspar intermixed with hornblende, together with a small quantity of quartz of the same colour with the felspar, and having disseminated a few grains of iron pyrites. This rock is intersected by veins of felspar, and contains kidneys of mica slate.

At the Birch Discharge, six miles N.N.W. of the Carp Portage, the same rock alternates with mica slate. The boundaries of the stream between these portages consist of the rounded ridges of gneiss above-mentioned. At the Birch-point Portage, two miles and-a-half above the Birch Discharge, the strata, consisting of grey gneiss, dip to the N.N.E. at an angle of 30°. The gneiss rocks continue with little variation for eleven miles, as far as Island Portage, where the rock running across the river, and producing a fine cascade, may be termed thick mica slate, containing much quartz. The strata dip here to the

* So named from the great number of sucking Carp (*Catas tomus Hudsonius*), which are observed endeavouring to surmount the rapid in the spawning season.

northward at an angle of 25°. Above this portage there is a small expansion of the river termed Island Lake, beyond which another contraction and fall is produced by the same rock. On the north sides of Heron and Pelican Lakes, the gneiss continues to form small naked eminences, but on the S.W. side of the latter, there are some conical hills, perhaps four hundred feet high, which laid at a distance from our route.

Above the Pelican Lake, the rocks approaching again, confine the stream, and produce several rapids. The strata here consist of gneiss approaching to mica slate, and contain beds of mica slate. They are much curved and distorted, and form bluntly conical eminences, rising abruptly from the stream. There are several mural precipices on the banks of the river. At the third portage, the gneiss dips to the eastward at an angle of 80°.

The shores of the Lake of the Woods are rocky, of moderate elevation, with some small conical hills, and generally pretty well wooded. The beds of mica slate are rather more numerous than in Pelican Lake. Above four miles and a half from the *Three Portages*, above the upper end of the lake, there is a bed of hornblende slate enclosed in the gneiss.

A small narrow piece of water, bounded by a continuation of the same rocks, conducted us from the Lake of the Woods to the Frog Portage, which forms the boundary betwixt the Mississippi and the waters falling into the Saskatchawan or Nelson River, and is three hundred and eighty paces long. The path leads through a low swampy wood, and over a flat tract of gneiss rising only a few feet above the waters on each side. The prevailing dip of the strata on our route between Beaver Lake and this place is N.E.

The Missinippi, or English River, through which our course now laid, resembles a chain of lakes with many arms, more than a river. The rocks to the eastward of the Otter Portage are, perhaps, members of the mica slate formation, but beyond that, they belong undoubtedly to the gneiss formation. They rise into craggy eminences, scarcely ever exceeding three hundred feet in height, and form numerous groups of islands in the lakes or skirt their irregular borders. It is only where the water has to force its way over a ridge of rocks, that it is narrowed into the dimensions of a river, and the contraction is always accompanied by a cascade or rapid.

An island in Race Lake, a short way above the Frog Portage, consists of hornblende slate. It dips N.W. at an angle of 45°—at the Grand Rapid eleven miles S.b.W. from the Frog Portage, the strata, consisting of mica slate, dip

to the eastward at an angle of 80°, and contain beds of hornblende rock and slaty quartz rock; the latter resting upon the former, and containing many minute veins and disseminated particles of calc-spar. At the Barrel Portage, two miles farther to the eastward, the same rock dipping to the northward at 80°. contains precious garnets. The river here has a majestic appearance, being upwards of a mile wide, and bounded by rocks two hundred feet high. The current is gentle.

At the Island Portage, four miles to the eastward of the last mentioned place, the stream is barred across by a ridge of red gneiss containing much felspar. It dips N.N.W. at an angle of 80°, and encloses many kidneys of flesh-coloured felspar. Eleven and a half miles to the westward, the gneiss contains hornblende; and half a mile farther on it approaches to mica slate, and dips N.N.W. at an angle of 45°. Beyond this place the river expands a little, and the rocky eminences have a general round-backed outline; but on a near approach they are rugged, and some short conical peaks occur. At the Little Rock and Mountain Portages, the strata consisting of mica slate dip N.W. at an angle of 60°; and at the Otter Portage, a light-red fine-grained gneiss dips to the northward at an angle of 70°. At the Great Devil Portage, two and a half miles N.W. b. W. of the Otter Portage, compact gneiss occurs dipping to the N.W. 80°. An expansion of the river above this place, termed the Devil's Lake, is very beautiful, containing many rocky islands, covered with spruce and aspen trees. The strata of gneiss in this lake had a direction from east to west, and were nearly vertical. At the Big Rock Discharge, nine and a half miles west of the Devil's Portage, the strata consist of gneiss. In an island, a little above it, there is a vertical bed of mica slate; and a mile farther on, at the Little Trout Rock, there is a bed of granite. Half a mile above, at the Trout Portage, the strata of gneiss enclose a bed of granite; and seven and a half miles S.W. b. W., at the Osier Portage, the strata consist of gneiss. Above this the river forms a considerable expansion, which is termed Black Bear Island Lake. The islands in this lake are very numerous, and consist mostly of round-backed elevations of gneiss extremely barren. One steep conical island, near the east end of the lake, consists entirely of large rounded masses of light-red granite, piled on each other to the height of a hundred and fifty feet. It seemed as if the softer parts of a bed of granite, projecting above the gneiss strata here, had been washed away, and left the more durable masses in their present position. This island

can scarcely have been formed by a collection of boulder stones, for it is not easy to conceive in what manner the action of the waves could have piled stones up in such a form, and still less to account for all these boulders, consisting of a coarse-grained granite, in a country composed of gneiss with many subordinate beds. At Cardinal's Rapid, at the west end of Bear Island Lake, there is a bed of mica slate; a short way below this the gneiss rises abruptly into a rounded island two hundred feet high. At the Portage de Canot Tournè, six miles and a half W.N.W. of Cardinal's Rapid, the strata, consisting of fine granular gneiss, with much mica, dip to the westward at an angle of 80°; and at the Pine Portage, a mile further, the same rock, preserving the same dip, alternates with a grey gneiss containing much less mica.

Above this place the country is more flat, better clothed with wood, and exhibits much less naked rock; the gneiss formation continues. In Sand Fly and Sandy Lakes, there are some moderate elevations of gneiss; the soil is sandy, and supports some groves of the Pinus Banksiana, which seldom grow in any other soil. The same rocks rose in round-backed ridges of greater elevation as we went to the northward in Knee Lake. Between Lake Primeau and Isle-à-la-Crosse Lakes, several beds of granite rise to the height of fifty or sixy feet above the gneiss, and some of them crossing the stream form a series of bad rapids.

After surmounting the last of these rapids, we ran for forty miles to the southward through Isle-à-la-Crosse Lake, and I imagine came again upon the verge of the limestone formation. The country is flat and sandy, varied only by some long low even ridges. Many fragments of the limestone, that has been already described, lie on the surface. Captain Franklin observed limestone in one part of Beaver River, which flows into the south side of Isle-à-la-Crosse Lake; and we were informed by the traders that it occurs throughout the river. The same sandy soil was observed in our progress up Deep River, and through Cross, Buffalo, and Methye Lakes. The ground here, however, is slightly varied with hill and dale. Where the river had made a section of the hills, they were observed to be composed of small boulders of gneiss and limestone, intermixed with fine white quartzy calcareous sand. On the south side of Buffalo Lake, there is a long low ridge, with a slightly crenated or indented outline. In Methye River the boulders are larger and more numerous, forming a long series of bad rapids in that

small stream. On the north side of Methye Lake, the elevations of sand assume a more decided hilly form, and on the further side of Methye Portage, they form boundaries to the beautiful valley of the Washacummow, from one thousand two hundred to one thousand five hundred feet high. The prevailing tree, in this sandy district, is the Pinus Banksiana. This valley from two to three miles wide, and bounded on each side by these almost precipitous sand-hills, is traversed by the Clear Water or Washacummow River. At the distance of ten miles below the portage, the channel of the river is obstructed by a ridge of limestone. This ridge appears to have once blocked up the outlet of the valley altogether, for portions of it still rise from the solid strata through the thin sandy soil of the plain to the height of fifty or sixty feet. These projecting parts have generally a columnar form, and bear from their arrangement a striking resemblance to the ruins of an extensive city. The stone much resembles that at the Grand Rapid on the Saskatchawan, but perhaps contains silica instead of alumina. Like that it yields readily to the action of the stream, falling down in large tabular masses. The outline of the sandy boundaries of this singular valley, strongly countenances the idea of the waters of the Washacummow having been at some distant period accumulated therein. Tongues of sand frequently project from the hills on each side, and run across the plain, exactly similar in appearance to the ridges thrown up by the currents, and eddies of an extensive lake. The ground on the portages sounds hollow; and this, together with the *ruinæ* form appearance of the rocks, and the occurrence of sulphureous springs in the neighbourhood, has impressed the traders with a notion that the whole has been the work of a volcano. From this spot downwards, the bed of the Washacummow is formed of this stone, or of a calcareous sandstone into which it passes. It produces a long succession of cascades and rapids. At the White Mud Portage the strata are horizontal, and consist of siliceous limestone. The portage obtains its name from the existence of some whitish marl in the hollows, formed by the decomposition of the rock. The same rock occurs at the Cascade and intermediate portages. A short way below the last portage, a small rivulet, having a strong smell of sulphurated hydrogen gas, flows in; and two or three sulphureous springs arise on the bank of the river, issuing apparently from a siliceous limestone. The beds of the springs were incrusted with calcareous tufa. Further down, the channel of the river is composed of horizontal beds of common yellowish-grey compact limestone. At the junction of the Red Willow River, there rises

through the soil a large mass of limestone which contains hornstone. We did not ascertain whether this mass was connected with the strata underneath, which consists of sandstone in plates.

Below this, where the Washacummow, in its winding course through the valley, approaches the high-bounding hills, sections of their sides, formed by the ravines which opened into the river, enabled us to observe that they were composed of sand more or less agglutinated by bitumen, which latter hardens into slaggy mineral pitch. This sandy bed, from six hundred to eight hundred feet thick, rests immediately upon yellowish-grey limestone containing many bivalve shells and orthoceratites. The dip, where it could be observed, (for it was very slight,) appeared to be to the northward. The limestone forms the channel of the river throughout, and some portions of it, decaying more rapidly than others, exhibit more plainly the shells which enter very largely into its composition. At the junction of the Washacummow with the Elk River, or as it is termed, at the Forks of the Athabasca, the northerly dip is more clearly discerned than elsewhere. The stream here, too, has made a section of the superincumbent bed of sand, upwards of one hundred and fifty feet in depth, and shews it to consist of a variety of strata, having different shades of colour and tenacity according to the quantity of bitumen they contain.

The limestone, more or less thickly covered with slaggy mineral pitch, continues to form the banks of Elk River, as far down as Pierre au Calumet, in lat. 57° 25′. The hills or banks, which bound the view on each side, do not rise so high as in Clear Water River; and we have been informed, that at a little distance from the river, a plain upon a level with the summit of these hills extends from near Athabasca Lake to the Clear Water River tolerably well wooded, and frequented by buffalo.

About nineteen miles below the Forks, and a mile within the right bank of the river, a saline sulphureous spring occurs. This spring rises from the summit of a rounded eminence, which is about fifty-six yards in diameter, sixty feet high, and entirely incrusted with, or perhaps in a great proportion composed of, saline deposits*. This eminence is bounded on three sides by the high bank of the river, which here recedes a little, and forms an even round-backed

* The following letter from Dr. Fife to Professor Jameson gives the analysis of a salt mentioned in a former page, as being found on the shores of a lake near Carlton-House, and also of the incrustation just spoken of in the text:

ridge, rising two hundred feet above the spring. A small clayey plain on the S. W. side of the eminence is traversed by the rivulet from the spring, and opens into a bay of the river. A large and apparently-travelled fragment of hornblendic gneiss lies on the acclivity under the spring, but the nearest rocks observed *in situ* were composed of yellowish-white compact splintery limestone.

At the new Fort, a considerable distance above *Pierre au Calumet*, a lime-stone similar to that last mentioned occurs, having its strata waved or dip-

Edinburgh, *January* 13, 1823.

DEAR SIR,

Enclosed is an account of the experiments performed on the substances you sent me for analysis.

First incrustation of white matter from the lake near Carlton-House:—

When put into water, it immediately agglutinated, forming minute hard globules which seemed to prevent the farther action of the fluid; but by heating it, it was entirely dissolved. The only substance I could detect in the solution by the use of re-agents was sulphuric acid in a state of combination. I accordingly suspected that the white matter was effloresced sulphate of soda. To ascertain if I was right in my suspicions, I dissolved a few grains by the aid of heat, and procured from the solution a beautiful group of regularly-formed prismatic crystals, resembling those of sulphate of soda, and which effloresced on exposure to a dry air. I consider the white matter then to be merely sulphate of soda deprived of its water of crystallization by long exposure to the atmosphere.

Second deposition from the Salt Springs in the Elk River:—

When recently broken, it presented in several places groups of irregular-shaped crystals, intermixed with a white powdery matter, and with a yellow substance resembling flowers of sulphur. It had a slightly saline taste, and, when rubbed, a faint sulphureous odour. When thrown on a hot iron, it emitted blue flame and the vapour of sulphureous acid. By long boiling in successive portions of water, it was almost all dissolved, the solution affording by the usual tests sulphuric acid, muriatic acid, lime, and magnesia. The muriatic acid and magnesia were, however, in small quantity compared to the others, and in the last portions of water in which the saline matter was boiled could scarcely be detected. As it did not attract moisture on exposure to air, I suppose the muriatic acid must have been in combination with soda, as muriates of lime and magnesia are both deliquescent. What was left undissolved by the water contained sulphur and a very minute quantity of iron.

I consider this incrustation, then, as composed principally of sulphate of lime, with a slight admixture of sulphate of magnesia and muriate of soda, and with sulphur and iron.

I regret that the time allotted me for the analyses was not sufficient to enable me to ascertain the proportion of the ingredients. Yours, &c.

ANDREW FYFE.

ping both to the east and west. Below this, there is a peaty bog whose crevices are filled with petroleum.

This mineral exists in great abundance in this district. We never observed it flowing from the limestone, but always above it, and generally agglutinating the beds of sand into a kind of pitchy sandstone. Sometimes fragments of this stone contain so much petroleum as to float down the stream. The limestone dips under the water and disappears at Pierre au Calumet, and the pitchy sandstone cliffs which rest on it also terminate there. This spot, situated between three or four miles below an old fort, obtains its name from a bed of yellowish-grey compact marl, which forms a small cliff on the bank of the river, and is quarried by the voyagers for the purpose of making *calumets* or pipes. A portion of this bed, acted on by the weather and the water of the river, is converted into earthy marl, and is much used by the traders under the name of *white earth* for whitewashing their apartments. Immediately under the marl, and generally covered by the river, there is a bed of limestone almost entirely composed of orthoceratites and bivalve shells*.

For some distance below Pierre au Calumet to a place called Burnt Point, the banks of the river rise in a gentle swell until they attain the height of 300 feet at a short distance from the shore. They appeared to consist of sand with limestone boulders, but we saw few sections of them. Between Burnt Point and Athabasca Lake, the banks are every where low and alluvial, containing much vegetable matter, and overgrown with willows and aspens.

In Athabasca Lake we again came upon the edge of the primitive formation. The country around Fort Chipewyan is composed of roundish masses of naked rock, which heaped, as it were, on each other, and rising as they recede from the lake, attain, at the distance of a mile from the shore, an elevation of five or six hundred feet. The valleys are narrow, their sides often precipitous, and the general form of the hills may be termed short conical, but their outline is very uneven. The rocks also form many islands in the lake from two to three hundred feet high, and generally bounded on one or more sides by precipices. The Fort seems to stand upon a granite rock. A little to the eastward, a reddish granite is associated with grey gneiss. The strata much convoluted and intersected in various directions by veins filled with a bluish

* This orthoceratitic limestone bears some resemblance to the mountain limestone of mineralogists. It may therefore possibly belong to the formation under the new red sandstone.

grey vitreous looking quartz. In a bay of the lake, about a mile farther to the eastward, there is a cliff of clay slate. On leaving Fort Chipewyan, we paddled through several miles of lake, and then descended the Stony River. Rocks, similar to those in Athabasca Lake, but possessing less elevation, rise above the swampy borders of this stream. At the distance of eighteen miles from Fort Chipewyan, it falls into the Peace River, when the united streams assume the name of Slave River.

The most abundant rock on the Slave River is granite. A red granite occurs opposite to the portage into Duck Lake. Near a point termed the *Bute*, the rocks, comprised of felspar, quartz, and chlorite, have a slaty structure. Below this, the granite rising in the channel of the river forms the Carrebœuf Islands. A rock, examined opposite these islands, was composed of felspar and quartz, probably a variety of granite. Lower down, the ridges of granite rise higher and prove a more formidable obstruction to the river, producing many cascades and rapids. At the Cassette Portage, a bed of mica slate, composed of grey quartz and mica, occurs in the granite. At the Little Rock Portage below the Portage d'Embarras, a rock, composed of felspar quartz and chlorite, occurs. It is similar to that observed at the Bute above-mentioned, but wants the slaty structure. It is the protogine of Jurine. At the upper end of Mountain Portage, the same chloritic, granite, or protogine, again occurs in large quantity. In the middle of the portage, a variety of this rock occurs, composed principally of quartz, with a little chlorite and felspar; and adjoining to this bed there is another, composed of red felspar and grey quartz. The protogine succeeding again forms the lower and principal part of the portage. At the Hauling Place below the Mountain Portage, a variety of granite which has been just mentioned as composed of red felspar and grey quartz again occurs, and alternates with the protogine both there, at the Pelican Fall, and at the *Portage des Noyes*. The granite disappears about a mile and a half below the latter portage, and the banks of the river from thence to Slave Lake are alluvial.

The Salt River flows in from the westward a short way below the portages. We ascended it for twenty-two miles, including its windings, but not above half that distance in a straight line, for the purpose of visiting the salt springs from whence it derives its taste and name. Seven or eight copious saline springs issue from the base of a long even ridge about six hundred feet high, and spreading their waters over an extensive clayey plain, deposit a considerable quantity of very pure common salt in large cubical crystals. The *mother*

water flowing into the Salt River gives it a very bitter taste, which it retains until near its junction with the Slave River, when the addition of some fresh water streams renders it only slightly brackish. A few patches of greyish compact gypsum were exposed on the side of the ridge from whence the springs issue, a fact which seems to point out the upper part of the new red sandstone, as the formation from whence they take their rise. A pure white gypsum is said to be found at Peace Point in Peace River, which is probably a continuation of this formation. The salt plains are much frequented by deer and buffalo.

The banks of Slave River, below the influx of Salt River, are, as have been already mentioned, entirely alluvial. A great quantity of large drift timber is brought down by Peace River; and as the trees retain their roots, which are often loaded with earth or stones, they readily sink, especially when water soaked, and accumulating in the eddies, form shoals which ultimately augment into islands. A thicket of small willows covers the new-formed island as soon as it appears above water, and their fibrous roots serve to bind the whole firmly together. Sections of these islands are annually made by the river, assisted by the frost; and it is interesting to study the diversity of appearances they present, according to their different ages. The trunks of the trees gradually decay until they are converted into a blackish-brown substance resembling peat, but which still retains more or less of the fibrous structure of the wood, and layers of this often alternate with layers of clay and sand, the whole being penetrated to the depth of four or five yards or more by the long fibrous roots of the willows. A deposition of this kind, with the aid of a little infiltration of bituminous matter, would produce an excellent imitation of coal with vegetable impressions of the willow root. What appeared most remarkable was the horizontal slaty structure that the older alluvial banks presented, or the regular curve that the strata assumed from unequal subsidence. It was on the rivers only that we could observe sections of these deposits, but the same operation goes on in a much more magnificent scale in the lakes. A shoal of many miles in extent is formed on the south side of Athabasca Lake, by the drift timber and vegetable *debris* brought down by the Elk River; and the Slave Lake itself must in process of time be filled up by the matters daily conveyed into it from Slave River. Vast quantities of drift timber are buried under the sand at the mouth of the river, and enormous piles of it are accumulated on the shores of every part of the lake. The waves, washing up much disintegrated vegetable matter, fill the interstices of these entangled masses,

and in process of time a border of spurious peat is formed round the various bays of the lake.

Moose Deer Island, and the islands adjoining to it, seem to be on the boundary of the limestone formation which we have so often mentioned. Large fragments of the stones containing shells were imbedded in the soil; and although we did not discover any of the rocks *in situ*, yet the form of the rising grounds, on the different islands, strongly countenanced the opinion that the strata underneath consisted of limestone. The stone, from Mr. Wentzel's information, occurs in horizontal strata, traversing the bed of the *Rivière aux Liards*, (the south branch of M'Kenzie's River,) and betwixt that and Slave Lake near the Trout River there is an extensive plain of white earthy marl, similar to that which we observed at Pierre au Calumet, on Athabasca River, associated with the limestone. Farther down M'Kenzie's River, and more to the westward, the coal formation exists. There are beds of coal on fire twenty or thirty miles above the influx of Great Bear Lake River, and below that there are petroleum and sulphur springs.

Reverting again to our route. Primitive rocks occur a little to the eastward of *Rivière à Jean*, one of the many channels by which Slave River pours its waters into the lake. Stony Island is a small naked rock rising fifty or sixty feet above the water, and precipitous on the north side. It is a mass of granite consisting of flesh-coloured felspar and quartz, with but little or no mica. The Rein-deer Islands, which lie in the traverse to the north side of the lake, consist of a much coarser granite with the mica in large plates. These islands are numerous, and rise from a hundred to two hundred feet above the water. They abound in precipices, and are for the most part naked; but towards the centres of the larger ones, there is a little soil and a few groves of pine. The same kind of granite prevails on the northern shores of the lake, from the Big Cape to some distance to the westward of Fort Providence. It forms small hills, with steep, somewhat precipitous, sides, and narrow valleys between.

The lower part of these hills generally consists of coarse granite, much intersected by veins of quartz and felspar, and frequently enclosing masses of felspar; their summits, on the contrary, mostly smooth and rounded, never peaked, are formed of a more compact and durable rock, which is the same kind of granite that is observed at Fort Chipewyan; and is composed of a crystallized red

felspar, intermixed with small rounded grains of quartz, generally grey, but sometimes tinged red. It contains little or no mica.

The granite formation continued for a considerable distance on our route towards Fort Enterprise, but it contained more and more foreign beds as we advanced to the northward. At our encampment of August 2d, on the borders of the lake, the strata consisted of clay slate, and had a slight dip to the northward. At the mouth of the Yellow-Knife River, and in Lake Prosperous, mica slate prevailed. Between Rocky and Carp Lakes, the granite contains many beds of mica slate, often passing into clay slate, and the country is tolerably well wooded. White spruce occupies the rocky situations, Pinus Banksiana the sandy spots, and aspen the low moist places.

At Carp Lake the hills are of lower altitude, have fewer precipices, and more rounded summits; the valleys are less fertile, contain a gravelly soil, and nourish fewer trees. This appears to be the commencement of the gneiss, or, as it may be termed in this latitude, the *Barren Ground* formation, for it seems to exist throughout the great district to the eastward of the Copper-Mine River, termed the Barren Grounds by the Indians. The soil appears to be very favourable to the production of the *cenomyces rangiferina* and *nivalis*, and some other congenerous lichens, but very inimical to every other species of vegetation. On the borders of the formation, as at Prospect Hill, a little above Carp Lake, trees occur only in detached and distant clumps. At Fort Enterprise, a thin grove grows in a very favourable situation on the sheltered banks of Winter River; but nearer the middle of the Barren Grounds there is not even a shrub to be seen, although parallel to them a strip of wood follows the transition, and secondary formations on the Copper-Mine River to a much higher latitude. Instead of enumerating the different places where the rocks were cursorily examined on our route, we shall confine ourselves more particularly to those of the same formation in the neighbourhood of Fort Enterprise, where, during our long stay, we had an opportunity of observing more closely the relations of the different rocks to each other.

The country about Fort Enterprise consists of short and very obtuse conical, or sometimes round-backed, hills, of moderate elevations, never disposed in mountain ranges, but entirely unconnected and separated from each other by inclined valleys of moderate extent. Their summits are almost

universally formed of naked smooth rock, and generally of a species of durable red granite that has been more than once mentioned as composed of well crystallized reddish felspar and grey quartz. Large irregular, but somewhat cubical, fragments of this rock are scattered over the surface of the hills, or rest upon their very summits, by two or three angular points, as if left exposed there by the decay of the less durable material that enclosed them. A remarkable instance of this occurs about a mile and a half to the southward of Fort Enterprise, on a hill which is thence termed the *Big Stone Hill.* This hill, which is the highest for many miles, rises from six to eight hundred feet above Winter River. The acclivities of the hills, generally speaking, consist of gneiss wrapped in a mantle form round the granite. These acclivities are more or less thickly covered with a coarse gravelly soil, and very often exhibit accumulations of large cubical fragments of gneiss, which fall from small mural precipices. In the upper parts of the inclined valleys, at the base of the hills, there is commonly a very thin layer of mountain peat, but the bottom of almost every valley is occupied by a lake. Most of these lakes communicate with each other only when flooded by the melting snow, and many of the smaller ones are entirely land-locked; they all contain fish. On the borders of the formation, where a few trees exist, the white spruce is confined to the sandy soil that is partially accumulated on the banks of the streams. A few birches sometimes grow amongst the large stones on the banks of a rapid, and two or three stunted black spruces now and then occur on the peaty spots.

It may be proper to mention the localities of some of the rocks about Fort Enterprise, where we had the best opportunity of examining this formation.

The strata at the base, and on the acclivities of the Big Stone Hill already mentioned, consist of granitic gneiss, its summit of red granite. A hill about a mile to the S. S. W. of this, composed of gneiss, dipping S. E. b. E. at an angle of 70°, presents a mural precipice of red granite traversed by a thick vein of augite green-stone; one portion of the vein may be termed basaltic augite green-stone. Half a mile further, in the same direction, there is a mural precipice, the loftiest in the neighbourhood, being one hundred and twenty feet high, which is formed of red granite, alternating with granitic gneiss. In a dilatation of Winter River, termed by the Indians the Lake of

the Round Rock, which commences about half a mile below the last-mentioned hill, and runs twelve miles in a S. S. W. direction, a red porphyritic gneiss, forming many mural precipices, exists subordinate to grey gneiss; the same rocks occur, with little variation, in Snare Lake, which immediately succeeds the other, and is fifteen miles long. But about thirty-six miles S. S. W. from Fort Enterprise, we again come upon the granite formation, through which we passed on our route from Fort Providence, and the country is well wooded. Specimens of the rocks obtained from that neighbourhood consisted of red granite, granite with pistacite, porphyritic, and hornblendic gneiss.

Returning again to Fort Enterprise—about two miles E. N. E. of the fort, or nearly the same distance N. E. of Big Stone Hill, there occur a succession of low cliffs formed by strata dipping north at an angle of 30°. The strata occur in the following order, beginning with the lowest:—gneiss with hornblende—red gneiss—ditto—coarse granular grey gneiss—ditto—ditto—and the covering stratum is composed of red granite and granitic gneiss, with kidneys of hornblende and mica. An obtuse conical hill, bearing N. N. E. from the fort, and three miles and a half distant, consists of strata arranged in a mantle form, but deficient on the N. E. side, where it is precipitous. This precipice is separated by regular fissures into large cubical masses similar to many which have accumulated at its base, and consists of hornblendic gneiss, which seems to constitute the nucleus or body of the hill. A thin layer of compact gneiss is wrapped round the hornblendic gneiss, and forms the acclivity and summit of the hill, making an angle of 70° with the horizon. Covering the base of this stratum, there is one of micaceous gneiss, over which there lies a thick bed of compact quartzy greenstone with disseminated magnetic pyrites. This rock affects the compass strongly, and its surface is variegated with streaks of a rusty brown colour from the weathering of the pyrites. Over the greenstone there is a bed of white granite. About half a mile to the eastward of the last-mentioned hill, there is a high bluff one which has a precipitous side fronting the S. W. The base of the precipice is formed of coarse granular gneiss, the summit of red granite, which falls down in tabular or cubical fragments. The Dog-Rib Rock, a remarkable hill, having three precipitous sides but a gradual ascent on the fourth, lies about eight miles N. b. E. from Fort Enterprise. The base of the hill consists of compact

hornblendic gneiss, which is traversed by a vein of very coarse granite several yards wide. The upper part of the hill consists of strata of hornblendic gneiss, dipping N. b. W. at an angle of 45°.

About thirty miles due north of Dog-Rib Rock, an irregular ridge of hills of coarse sand and gravel occurs. The intermediate district is a continuation of the gneiss formation, without any material alteration in appearance, and beds of gneiss or granite occasionally shew themselves at the foot of the ridge. These sand hills constitute a small height of land between the source of Winter River and a dilatation of the Copper-Mine River, named Point Lake. The gneiss appears in abundance on the north side of this height, associated with much mica slate and some clay slate. The hills are higher here, and the valleys narrower and deeper, than in the neighbourhood of Fort Enterprise.

On an arm of Point Lake, about forty-five miles due north of Fort Enterprise, the rocks belong to the transition class. The hills here are six or seven hundred feet high, and are in their general character rather round-backed, but obtuse conical elevations and high and steep cliffs are very numerous.

At the encampment in lat. 65° 13′ N., from whence we started on June 25th, the following strata occur, dipping to the westward at an angle of 80°, but much waved and convoluted:—Greywacke passing into Greywacke slate—Greywacke with small imbedded crystals of hornblende—dark greenish or blackish grey transition clay slate, having a thick slaty structure. Several flat islands in the lake consist of transition green stone. A rock standing apart from the neighbouring hills on the borders of the lake, about a mile and a half to the southward of the encampment, having a rounded summit, but bounded on three sides by mural precipices about two hundred feet high, is composed of compact earthy greenstone, containing disseminated iron pyrites covered with layers of transition greenstone slate. The precipices in some places present a very obscure appearance of twisted columnar structure, and the rock falls down in large irregular but somewhat rhomboidal fragments. The upper and under surfaces of these fragments are smoothish, and present a greater quantity of pyrites than is disseminated through the rest of the rock. On the north side of the lake, two miles from the encampment, there is a high bluff hill with a precipitous side, which seems to consist principally of a transition conglomerate. The basis is earthy clay slate. The imbedded masses

have an ellipsoidal form and smooth surface, are from one to two feet in diameter, and appear to consist of the same material with the basis, but impregnated with much silica, and not shewing evident slaty structure. When broken, they present an even fine grained fracture.

In the sheltered valleys on this part of Point Lake, a few clumps of good-sized spruce fir occur; farther to the eastward, at Obstruction Rapid, where the gneiss formation of Fort Enterprise seems to cross the river, and extend beyond Rum Lake, there is no wood.

During our first and second day's journey down Point Lake from the above-mentioned encampment, being eleven and a half miles on a W.N.W. course, the rocks we had an opportunity of examining, consisted of greenish-grey transition clay slate, generally having a curved structure, and splitting into slates of very unequal thickness.

On the following day, June 27th, our route lay to the N.W. for ten and a half miles through a part of the lake, whose bounding hills bore a strong resemblance in altitude and form to those about Fort Enterprise. The rocks we examined were grey gneiss, red granite, hornblendic gneiss, and a crystalline greenstone. These rocks form high and precipitous islands, and shores at the west end of Point Lake, but the appearance of the country alters immediately on entering Red Rock Lake. The strata here belong, most probably, to the transition series, which, at the lower end of Point Lake, had given place to, or perhaps alternated with, primitive rocks. The hills which bound Red Rock Lake are four hundred or five hundred feet high, have an even round-backed outline, present few cliffs and little naked rock, have rather moderate acclivities, and are thinly covered with small white spruce trees. The *cenomyce rangiferina*, and other lichens, so abundant on the barren grounds, become rare here, and continue so throughout the remainder of the Copper-Mine River. A bed of reddish clay slate was observed at the upper end of the lake, and large fragments of the same rock thickly strew its shores. At the lower end of the lake, a greenish-grey faintly glimmering clay slate occurs, dipping W. b. N. at an angle of 30°.

We passed through Rock-Nest Lake on June 30th. With the exception of the Rock-Nest, and one or two hills adjoining it apparently composed of trap rocks, the borders of this lake are low, consisting of long even gentle elevations, every where well clothed with spruce trees. The strata, where we had

an opportunity of examining them, consisted of clay slate. At the place of our encampment, on the 30th, the clay slate had a colour intermediate between greenish grey and clove brown; the surface of the slates feebly glistening, cross fracture dull, structure rather thick slaty, and dip of its strata E.N.E. at an angle of 40°. The Rock Nest bore an exact resemblance in altitude and form to Salisbury Craigs in the neighbourhood of Edinburgh. I am inclined to think that the cliff which crowned it was transition green-stone, and the steep acclivity clay slate, but we had not an opportunity of examining them.

After leaving Rock-Nest Lake, the Copper-Mine River flows for six or seven miles between banks, consisting of gentle elevations and dales, wooded to the edge of the stream, and flanked on both sides, at the distance of three or four miles, by a range of very barren hills, with steep acclivities and rounded summits. The channel of the river is rocky, producing a series of rapids; but unfortunately the notices respecting the strata have been lost, and we have only a general impression that a hornblendic gneiss, probably of the transition series, was abundant. On descending the river still farther, the high hills recede a little, and the rocks on the immediate borders of the stream give place to fine sand, in which the river has made sections from one hundred to two hundred feet deep. Sandy plains, on a level with the summits of the cliffs, thus produced, extend six or seven miles backwards, and are bounded by irregular ranges of hills eight hundred or a thousand feet high. These hills are round-backed, with moderately steep acclivities, but they are sometimes, though not frequently, terminated by high cliffs. We were precluded from visiting them by their distance. The plains are chequered with small clumps of wood, and produce a short grass which attracts the musk oxen thither at certain seasons, but few rein deer frequent this part of the country. About twenty or twenty-five miles below the Fairy-Lake River, the woods become thinner and more stunted, and the barren hills approach the water's edge. The sandy banks re-appeared, however, at intervals, and in some places the river expanded considerably, flowing with a gentle current over a fine sandy bottom. Its medium breadth may be stated at three hundred yards, which in the rapids was diminished to half that width. A few miles farther down we approached hills from twelve to fifteen hundred feet high, running in ranges nearly parallel to the river or about N.W. These were the first hills we had seen in the country that can be said to possess the form of a connected moun-

tain range. They are in general rather round-backed, but the outline is not even, being interrupted by craggy eminences rather obtusely conical. It is very probable that they are a part of the range upon which Hearne bestowed the name of Stony Mountains.

We encamped on the night of July 6th in lat. 66° 45′ 11″, longitude 115° 42′ 23″, and forty-three miles W. b. N. of the Sandy River, at the foot of the most rugged part of the range, where it is washed by the river. A high peak, which was examined here, consisted of red granite and sienite, and some large beds of greenstone were also observed; but perhaps all these rocks are subordinate to the clay-slate formation, that rock occurring in considerable quantity here, having a greenish colour, and continuous pearly lustre. The rocks at this spot appear to be primitive, but they are soon succeeded by others, which have more the aspect of the transition class. Seven miles further down the river, at the encampment of July 7th, the hills shewed less elevation and a more even outline, with less exposed rock. That which was observed consisted of a more dull and earthy clay slate.

Leaving this place on July 8th, we continued our course down the river, which flowed for some miles between two ranges of hills, pretty even in their outline, and round-backed, but with rather steep acclivities. The immediate borders of the stream were either high banks of fine sand, or steep gravel cliffs; and sometimes in places where the hills receded to a little distance, the intervening space was occupied by high sandy ridges, apparently the ancient banks of the river. We now approached a range of hills which were visible from yesterday's encampment, and which in form bore a considerable resemblance to those in the neighbourhood of Point Lake, but having more the appearance of a connected range. We had no opportunity of examining these hills, but judging from the analogous forms of those at Point Lake, we infer that they consist of clay slate, hornblendic gneiss, and granite, connected with rocks of the transition series. The Copper-Mine River runs to the westward in a tortuous course along the foot of this range, until it succeeds in effecting a passage through it in 116° 31′ west longitude. At this place, according to Indian account, the Bear Lake approaches nearest to the Copper-Mine River, the breadth of the height of land between them not exceeding thirty or forty miles. Below this spot, which is marked by the influx of a small stream, the river assumes a northerly course, and becoming much narrower and more rapid,

passes betwixt high but even ranges of round-backed hills, between which and the water there are interposed high and steeply-rounded banks of a clayey soil, well covered with trees.

The beds of the Mountain Torrents, which open into the river here, contain many fragments of a dark red sandstone, which would seem to indicate that the old red sandstone formation occurs in these mountains. The river contracting to the width of a hundred and twenty yards, at length forces itself through the *Rocky Defile*, a narrow channel which it has cut during a lapse of ages in the shelving foot of a hill. The channel is bounded by perpendicular rocky walls, varying in height from fifty to a hundred and fifty feet, above which there is imposed an immense body of fine sand. The form of the land would lead one to suppose, that the river at some distant period, pent in by the rock, formed a long narrow lake, whose superfluous waters were discharged by a magnificent cascade—an opinion which is countenanced by the figures of the sandy ridges, which rise immediately above the rapid to the height of five hundred or six hundred feet. The walls of the rapid consist of a very dark purplish-red compact felspar rock. It probably belongs to the old red sandstone formation, and seems to rest upon or to alternate with a rock, which seems to be a variety of the old red sandstone, and which is composed of light-reddish and greyish felspar and quartz, the former indistinctly crystallized. This latter rock is every where exposed in the bed of the river for ten or twelve miles below the rapid. For this space the river flows about three hundred feet below the level of a sandy plain, which is bounded to the westward at a considerable distance, by a continuation of the range of hills through which the river forces itself at the Bear-Lake Portage, and to the eastward and northward by a lofty ridge of trap rocks, which constitute the famous Copper Mountains. The surface of these plains is variegated by some small conical sandy eminences, and ornamented by clumps of moderately large spruce trees (thirty feet high), amongst which the River Mouse winds, and falls into the Copper-Mine River from the westward. In the beds of the torrents that intersect the plains, there are found fragments of reddish-grey granular foliated limestone, of deep red sandstone, of grey sandstone composed of grey quartz and felspar, probably a variety of the preceding, and of red sienite, all members, perhaps, of the *old red sandstone formation*, or that which lies under coal, and occasionally alternates with transition rocks. There occur also fragments of pale red sandstone, composed principally of quartz, and

a little felspar with imbedded circular concretions of quartz; and of greyish-white quartzose sandstone, with imbedded portions of the pale-red kind, both of which probably belong to the *new red sandstone formation*. Fragments were also found of dark-greeny felspathose trap, coloured by hornblende, of greenstone, of dark-flesh red felspar in granular concretions, with imbedded patches of hornblende, of red felspar, associated with hornblende, and passing to greenstone; and of red felspar partly coloured with hornblende, and containing amygdaloidal portions of prehnite, most of which belong to the *trap formation*, connected with the new red sandstone. Many pretty large masses also occur of a compact wine-yellow limestone, resembling conchoidal hornstone, having a flat conchoidal fracture, and alternating with thin layers of flint inclining to flinty slate. This stone is precisely similar to some of the more compact varieties of the limestone near Cumberland-House, although in the latter situation we never observed it associated with flinty slate.

The Copper Mountains consist principally of trap rocks, which seem to be imposed upon the new red sandstone or the flœtz limestone which covers it. A short way below the influx of the Mouse, the Copper-Mine River washes the base of some bluish-grey claystone cliffs, having a somewhat slaty structure, dipping to the north at an angle of 20°.

The Copper Mountains appear to form a range running S.E. and N.W. The great mass of rock in the mountains seems to consist of felspar in various conditions; sometimes in the form of felspar rock or claystone, sometimes coloured by hornblende, and approaching to greenstone, but most generally in the form of dark reddish-brown amygdaloid. The amygdaloidal masses, contained in the amygdalord, are either entirely pistacite, or pistacite enclosing calc-spar. Scales of native copper are very generally disseminated through this rock, through a species of trap tuff which nearly resembled it, and also through a reddish sandstone on which it appears to rest. When the felspar assumed the appearance of a slaty clay-stone, which it did towards the base of the mountains on the banks of the river, we observed no copper in it. The rough, and in general rounded and more elevated parts of the mountain, are composed of the amygdaloid; but between the eminences there occur many narrow and deep valleys, which are bounded by perpendicular mural precipices of greenstone. It is in these valleys, amongst the loose soil, that the Indians search for copper. Amongst the specimens we picked up in these valleys, were plates of native copper:

masses of pistacite containing native copper; of trap rock with associated native copper, green malachite, copper glance or variegated copper ore and iron-shot copper green, of greenish-grey prehnite in trap, (the trap is felspar, deeply coloured with hornblende,) with disseminated native copper: the copper, in some specimens, was crystallized in rhomboidal dodecahedrons. We also found some large tabular fragments, evidently portions of a vein consisting of prehnite, associated with calcareous spar, and native copper. The Indians dig wherever they observe the prehnite lying on the soil, experience having taught them that the largest pieces of copper are found associated with it. We did not observe the vein in its original repository, nor does it appear that the Indians have found it, but judging from the specimens just mentioned, it most probably traverses felspathose trap. We also picked up some fragments of a greenish-grey coloured rock, apparently sandstone, with disseminated variegated copper ore and copper glance; likewise rhomboidal fragments of white calcareous spar, and some rock crystals. The Indians report that they have found copper in every part of this range, which they have examined for thirty or forty miles to the N.W., and that the Esquimaux come hither to search for that metal. We afterwards found some ice chisels in possession of the latter people twelve or fourteen inches long, and half an inch in diameter, formed of pure copper.

To the northward of the Copper Mountains, at the distance of ten miles, in a direct line, a similar range of trap hills occurs, having, however, less altitude. The intermediate country is uneven, but not hilly, and consists of a deep sandy soil, which, when cut through by the rivulets, discloses extensive beds of light-brownish red sandstone, which appears to belong to the new red sandstone formation. The same rock having a thin slaty structure, and dipping to the northward, forms perpendicular walls to the river, whose beds lie a hundred and fifty feet below the level of the plain. The eminences in the plain are well clothed with grass, and free from the large loose stones so common on the Barren Grounds, but the ridges of trap are nearly destitute of vegetation.

Beyond the last-mentioned trap range, which is about twenty miles from the sea, the country becomes still more level, the same kind of sandstone continuing as a subsoil. The plains nourish only a coarse short grass, and the trees which had latterly dwindled to small clumps, growing only on low points on the edge of the river under shelter of the high bank, entirely disap-

pear. A few ranges of trap hills intersect this plain also, but they have much less elevation than those we passed higher up the stream.

The river in its section of the plain, as far as Bloody Fall, presents alternately cliffs of reddish sandstone, and red-coloured slaty indurated clay or marl, and shelving white clay banks. At Bloody Fall, the stream cuts through a thick bed of dark purplish red felspar rock, similar to that observed at the Rocky Defile, and associated as at that place, with a rock composed principally of light red felspar and quartz, but which is probably a species of red secondary granite. At the Bloody Fall, the felspar rock is covered to the depth of six or seven hundred feet with a bed of greyish white, and rather tenaceous clay, which being deeply intersected with ravines, forms steep hills. Nearer the sea, the river is bounded by very steep cliffs of yellowish-white sand; and on the sea-coast, the above-mentioned red granite re-appears on the west bank of the river, forming a rugged ridge about two hundred and fifty feet high.

The islands that we observed in the Arctic Sea are uniformly rocky, and generally bounded with mural precipices of trap rocks, clinkstone or claystone, which have a surprising uniformity of appearance. The main shore, however, presents some diversity. For sixty miles eastward of the Copper-Mine River, the beach is low, shelving, and gravelly, and the ground in the interior has a gentle rise and even outline. Towards Tree River, however, the trap rocks re-appearing form an exceedingly sterile and rocky coast. The cliffs of the islands on which we landed were composed of greenstone, dark brown claystone, porphyry, and perhaps of basalt, but of the occurrence of the last-mentioned rock we are not quite certain. Three or four miles to the westward of Port Epworth, a steep promontory is formed of a rock which is composed of red felspar, quartz, and is a variety of the secondary granite already mentioned. At Port Epworth, the country is exceedingly sterile; one cliff rising above another with stony valleys between, almost destitute of herbage. The rocks observed here were liver-brown clinkstone porphyry, with a few beds of earthy greenstone. The same formation extended to the mouth of Wentzel's River, the trap cliffs succeeding each other with tiresome uniformity, and their debris entirely covering the narrow valleys that intervene to the exclusion of all vegetation. None of the rivers on this part of the coast bring down any drift timber. To the eastward of Wentzel's River, the coast running out forms Cape Barrow. We rounded this large projection in thick

foggy weather, which permitted us to have a very indistinct view of the shore; but we landed on several parts near the pitch of the cape, and found the rocks to consist of a beautiful admixture of red and grey granite, forming very steep craggy, and acute peaks, rising abruptly from the water to the height of one thousand five hundred feet. The granite is traversed by large veins of red felspar running from N. to S., intersected at right angles by smaller veins. In one or two places, the larger veins were filled with greenstone. The granite hills terminate abruptly, or recede from the coast at Detention Harbour, and give place to much less elevated strata of gneiss, enclosing some beds of red granite. A vein of galena was traced for two hundred yards, running through the gneiss at Galena Point. This vein, about two inches in diameter, was entirely filled with galena, without the slightest appearance of any sparry substance. A few miles to the eastward of Galena Point, the gneiss recedes from the shore, and appears to enter into the composition of a ridge which runs nearly in a straight line until it is cut by Hood's River, about fifteen miles above its mouth. On the western point of Moore's Bay, there is a precipice of indurated iron-shot slaty clay. The promontory which forms the east side of the same bay is formed of trap rocks and claystone porphyry, whose mural precipices constitute the sides of very narrow valleys that open at each end to the sea. Several species of carex grow in these wet and spongy valleys, on which account the rein-deer seem to resort to them. Very few lichens were observed. Some small fragments were found amongst the debris of the porphyry, containing copper green and scales of native copper.

From Moore's Bay to the entrance of Arctic Sound, an iron-shot clinkstone porphyry prevails, having a columnar appearance. The eastern shore of Arctic Sound, rising gently towards the ridge of gneiss lately mentioned, is covered with grass, and presents little or no naked rock; but on Banks's Peninsula, the clinkstone porphyry re-appears along with an earthy-looking greenstone, forming, as usual, parallel ranges of mural precipices.

On the eastern point of Brown's Passage, the strata consist of light red sandstone dipping slightly to the westward, succeeded by bluish-grey slate clay, and having lofty cliffs of greenstone, iron-shot amygdaloid and trap tuff superimposed. On Barry's Island, which lies off this part of the coast, the rocks consist of trap rocks, forming cliffs from fifty to one hundred and sixty feet high, superimposed on thick beds of indurated clay or marl, variously

coloured red or grey in thin horizontal strata. On the northern extremity of the island, there is a red amygdaloidal rock which contains many beautiful pebbles, and some imbedded masses of jasper. Most of the pebbles are composed of concentric layers of calcedony with drusy cavities, but some of them approach nearly to pure carnelian.

Near the encampment of August 3, a dark red cliff, probably of claystone porphyry, is intersected by a vein several yards thick of a bluish-white substance. The vein made an angle of forty-five with the horizon, and was seen at a considerable distance. We had no opportunity of examining it. Nearly opposite to this, near Sir James Gordon's Bay and Tinney's Cove, some portions of the sandstone strata, of a reddish-grey colour, have a beautiful porphyritic appearance from imbedded pieces of white quartz, mostly quadrangular, and about an inch in diameter. Other portions of the rock had none of these imbedded pieces.

Between this spot and the mouth of Back's River, the eastern shore of Bathurst's Inlet consists of gneiss, with beds of granite, forming a continued range of hills rising pretty steeply from the water to the height of five or six hundred feet.

In Sir James Gordon's Bay, the strata consist chiefly of light red and greyish sandstone, still of the new red sandstone formation, with trap rocks generally greenstone. To the northward of Fowler's Bay, the gneiss re-appears, containing beds of granite and hornblendic gneiss. In one spot near Point Evritt, hexagonal crystals of hornblende, some of them above a foot long, occur, imbedded in the gneiss. Most of the crystals were contaminated with scales of mica. The islands in the offing consist, as usual, of flœtz trap, or porphyry; and on the north side of Buchan's Bay, the new red sandstone re-appears, having a fine grain and light-red colour. Cape Croker is composed of red sandstone, whose *debris* form a shelving and utterly barren shore.

The northern shore of Melville Sound has a barren clayey soil, which, when washed away, exposes strata of greyish-white sandstone, associated with or passing into a slaty clay. A few cliffs of greenstone or claystone porphyry, superimposed on the flat strata, presented from the opposite coast as we entered the sound, the appearance of islands. Had the intermediate low land been visible, a tedious circumnavigation of the sound would have

been spared. The coast presented the same appearance as far as Point Turnagain.

The horizontal strata consisted of a kind of greyish-blue slaty clay, much impregnated with quartz, and passing into the new red sandstone. Cliffs of greenstone, porphyry slate, or red amygdaloid, were frequently imposed on the clay. At Slate Clay Point, on the eastern side of Walker's Bay, the layers of the indurated slate clay were disposed in a concentric manner, so as to form large globular concretions. The outer layers of the concretions running insensibly into each other.

Having now enumerated, as distinctly as circumstances would permit, the rocks we had an opportunity of observing on the coast, we may state that the new red sandstone formation seems to prevail. All the islands visited were formed of trap or porphyry belonging to that formation, and judging from similarity of form, the rocks of the other islands belong to the same class. The gneiss formation is next in extent, and indeed it appears to run nearly parallel to the coast within the red sandstone from Cape Barrow across Hood's River above Wilberforce Falls to the bottom of Bathurst's Inlet, and from thence to Hope's Bay, on the western side of Melville Sound. The only foreign beds we observed in the gneiss were granite, perhaps quartz rock, and hornblendic gneiss, or sienite. We saw no clay or mica slate, nor did we observe any formations intermediate between the gneiss, and new red sandstone; nor, except at Cape Barrow, where granite predominates, any other formation than the two just mentioned. Our opportunities for observation, however, were not extensive, the necessity of proceeding without delay limiting our geognostical and botanical excursions to the short period that was required to prepare breakfast or supper.

From Point Turnagain, we proceeded to Hood's River, and traced it for some distance. The river, at its mouth, is from one to three hundred yards wide, and is bounded by steep and high banks of clay, reposing on floetz rocks, which occasionally shew themselves. At the first rapid, in lat. 67° 19′ 23″, a bed of reddish secondary granite crosses the stream. At the second rapid, in lat. 67° 12′ 14″, and in other places, the rocks consist mostly of the red indurated slaty clay, or the red amygdaloid, which we often saw on the coast associated with the new red sandstone. Six or seven miles higher up, at Wilber-

force's Falls, the river makes a descent of about two hundred and fifty feet into a chasm, whose walls consist of light-red felspathose sandstone, belonging most probably to the old red sandstone formation, or that which lies under coal, and occasionally alternates with transition rocks.

The gneiss formation appears a short distance above these falls, producing hills precisely similar in character to those about Fort Enterprise. After quitting Hood's River, and ascending out of the valley through which it flows, we entered upon an even clayey and very barren country, interspersed with shallow lakes. This plain continued nearly to Craycroft's River, when the gneiss re-appeared, presenting the genuine barren ground hills and precipices, together with their vegetable associates, *cenomyce rangiferina*, *cetraria nivalis*, *cucullata* and *islandica*, *cornicularia ochrileuca*, *dufourea arctica*, *arbutus alpina*, *rhododendron lapponicum*, and *empetrum nigrum*, plants which seem to characterize the Barren Grounds. This formation continues without any essential change of aspect, but with some occasional differences in the altitude of its hills, until it unites with the Fort Enterprise district at Obstruction Rapid, between Providence and Point Lakes. Its hills assume the form of ranges in the neighbourhood of Congecathewachaga and Rum Lakes. It is to be observed, however, that we travelled over this district when the ground was deeply covered with snow; and when circumstances were not favourable either for observing or recording the appearances of the rocks, with sufficient accuracy for drawing up a geognostical account of them at a future period.

We shall now proceed to offer a few

CONCLUDING REMARKS.

The observations of Werner, Humboldt, Von Buch, Saussure, Ebel, and Daubuisson, in many districts in the continent of Europe and in America, and by Jameson in Scotland, shew that the general direction of the primitive and transition strata, is nearly from N.E. to S.W. It is, therefore, interesting to find, that the general result of my notes on the positions of these rocks which we traced (except in a few instances when our route lay to the westward of their boundary) through twelve degrees of latitude, also gives N.E. and S.W. as the average direction of their strata.

The strata of the two classes of rocks just mentioned, were always more or

less inclined to the horizon, the mean angle considerably exceeding 45o. Their dip was sometimes to the east, sometimes to the west.

These rocks exhibited the same varieties of structure, that they do in other extensive tracts of country. In general, the slaty structure was parallel to the direction of the strata, as in gneiss, mica-slate, clay-slate, &c. When the waved structure made its appearance, it was sometimes conformable with the seams of stratification, as was very often noticed in the transition clay-slate of the Copper-Mine River ; or it was entirely independent of these, and then it was very irregular in its direction. The *apparently-confused* arrangements of structure of clay-slate and other slaty rocks, more particularly observed at the magnetic islet in Knee Lake, and on Point Lake, proved, on a more extended and accurate examination, to be caused by the arrangement of the mass of strata into variously-formed distinct concretions, in many of which the direction of the slaty structure was under very different angles, and in very different directions. In short, in these apparently-disturbed strata we had, though on a great scale, the same beautiful arrangement that occurs in the rock named by Werner, " Topaz Rock." Independent of these various structures observable in individual strata, we remarked that the strata themselves, whatever their structure might be, were either variously waved or quite straight in their direction.

The general forms, connexions, and distributions of the mountains, hills, and plains, in the tracts we traversed, and of the cliffs on the coast of the Arctic Sea, were nearly the same that geologists have remarked as characterizing similar rocks, similarly circumstanced in other quarters of the globe.

Granite with sienite, gneiss, mica-slate, and clay-slate, which some geologists consider to be the predominating primitive rocks, occur in all their usual relations ; of these the gneiss appears to be the most extensively distributed, and to be always attended with a very scanty vegetation. Granite is the next in frequency, then mica-slate, and the least abundant are the clay-slate and protogine. The granite is generally of a red colour, and varies from coarse to small granular. The loose blocks of stone, which crown the summits of almost all the hills in the *Barren Grounds*, are generally of this latter variety. Of the gneiss there are two varieties, the one red and the other grey. The mica-slate, clay-slate, and sienite, present the common varieties. The protogine granite, of which there is considerable abundance in Slave River, and in some other quarters, appears to belong to the mica-slate formations.

These primitive rocks are traversed by veins of felspar, quartz, and granite; and the granite of Cape Barrow was also intersected by veins of augite greenstone of the same description with those met with in the granite districts of Great Britain. The occurrence of the vein of galena, at Galena Point, is an interesting fact, as connected with the geographical distribution of that important ore. The Esquimaux, that frequent the shores of the Arctic Sea, make their culinary utensils of potstone, but we did not discover the place from whence they obtained it.

The transition rocks were observed *in situ*, only on Point Lake, on the Copper-Mine River, and, perhaps, at Wilberforce Falls on Hood's River, and as far as our observations extended, afforded neither limestone nor lydian stone. None of the transition slate that we examined contained chiastolite; and if any beds or imbedded masses of glance coal existed, they escaped our notice. The transition rocks being principally clay-slate and grey wacke, bore a strong resemblance to those in Dumfries-shire, my native county.

The secondary formations, if examined by travellers more fortunately situated than we were, will doubtless exhibit many curious and highly-important relations. The facts already stated, shew that the following formations of this class occurred on or near the line of our journey.

First, The *old red sandstone*, or that which lies under coal, and occasionally alternates with transition rocks. This was observed upon the Copper-Mine River.

Second, The *coal formation*, which did not present itself in the direct line of our route; but as it is known to occur in some districts in M'Kenzie's River, and also towards the Rocky Mountains, placed apparently upon the old red sandstone, and under the vast deposit of secondary limestone, it is here mentioned.

Third, The *new red* or *variegated sandstone*. This important formation is of very considerable extent in several of the tracts we passed through, and probably lies over an extensive deposite of the coal formation. In some instances, where the old red sandstone was wanting, it appeared to us resting upon gneiss and other primitive rocks. Here, as in other quarters of the world, the new red sandstone contains gypsum and salt springs that seem to issue from it, implying that it contains beds of salt or of muriatiferous clay, which afford the impregnating material to the springs. The springs on the Slave River afford by spontaneous evaporation during the short summers, a very large quantity of fine salt.

Fourth, The secondary limestone appears generally to belong to the vast deposite which lies above the new red sandstone and under chalk, and which is known to form very extensive tracts of country, not only in other quarters of North America, but also on the continent of Europe and in England. Some of the varieties may, on more minute examination, prove to belong to the mountain limestone of geologists.

Fifth, The secondary trap and porphyry rocks, which occur so abundantly on the coast of the Arctic Sea, and throughout the whole extent of the Copper Mountains, are to all appearance connected with the new red sandstone. The frequency of native copper in those rocks, both on the Copper Mountains and on the sea-coast, is a very interesting feature in their composition, and deserves the particular consideration of those who make the grouping or associations of simple minerals objects of attention. Many of these trap and porphyry rocks presented the columnar structure which has been considered as indicative of a volcanic origin, but their other characters and the horizontal strata upon which they reposed seemed to give them a still greater claim to Neptunian origin. Our opportunities of observation, however, were much too limited to permit us to offer a decided opinion upon this disputed point.

Alluvial Deposites.—The extensive formation of these deposites in the line of our journey, afforded us numerous examples of their different kinds. In the preceding notes, we have alluded to extensive alluvial formations, occasioned by lakes which have either gradually dried up, or have burst suddenly and left their concavities more or less deeply covered with sand, gravel, and other alluvial matters. Other kinds have evidently had their origin from the action of rivers. Some formations on the sea-coast were occasioned by the conjoined action of the sea, and the wasting influence of the weather. The peninsula, between Point Turnagain and Melville Sound, is almost entirely composed of a low flat of this kind, a few trap cliffs appearing at considerable distances only. The general wasting influence of the weather on the more elevated exposed rocks throughout the country, has formed a covering of alluvial matter of greater or less depth to the subjacent rocks, which protects them from the further gnawing effects of the atmosphere.

With regard to the large rolled blocks which are so plentifully scattered over the surface of some countries, and which have been considered to have been deposited by the waters of the flood, we have no remarks of moment to

make. During our journey from York Factory to Fort Enterprise, we seldom had an opportunity of ascending out of the valley of the river through which our route lay, and any blocks of stone observed in such a situation may as readily be supposed to have been transported by the river as by a more general cause. On the Barren Grounds, where we adopted a different style of travelling, the loose stones which were very numerous, even in the most elevated situations, were, as far as we observed, similar to the rocks on which they rested, and may be supposed to be the more durable remains of the covering strata, which have been destroyed by long-continued action of the atmosphere. Their angular forms and their resting-places, often upon the very summit of the hills, militate against their having travelled from a distance.

The very general, though rude, resemblance these blocks bore to large crystals is a remarkable circumstance, and seems to indicate a crystallization in the great of the red granite, of which they were very frequently composed, and of whose beds or strata they are perhaps the remains.

We may conclude with observing, that the preceding details shew that in the regions we traversed, the rocks of the primitive, transition, secondary, and alluvial classes have the same general composition, structure, position, and distribution, as in other parts of America which have been examined; and as these agree in all respects with the rock formations in Europe and Asia, they may with propriety be considered as universal formations, parts of a grand and harmonious whole, the production of infinite wisdom.

No. II.

AURORA BOREALIS.

GENERAL REMARKS.

So few observations of the Aurora Borealis in high northern latitudes have been recorded, that I trust a minute account of the various appearances it exhibits, will not be thought superfluous or uninteresting. The remarks of the late Lieutenant Hood are copied verbatim from his journal. They speak sufficiently for themselves, to render any eulogium of mine unnecessary. To this excellent and lamented young officer, the merit is due of having been, I believe, the first who ascertained by his observations at Basquiau-Hill, (combined with those of Dr. Richardson at Cumberland-House,) that the altitude of the Aurora upon these occasions was far inferior to that which had been assigned to it by any former observer. He also, by a skilful adaptation of a vernier to the graduated circle of a Kater's Compass, enabled himself to read off small deviations of the needle, and was the first who satisfactorily proved, by his observations at Cumberland-House, the important fact of the action of the Aurora upon the compass-needle. By his ingenious Electrometer invented at Fort Enterprise, he seems also to have proved the Aurora to be an electrical phenomenon, or at least that it induces a certain unusual state of electricity in the atmosphere.

The observations of Dr. Richardson, independent of their merit in other respects, point peculiarly to the Aurora being formed at no great elevation, and that it is dependent upon certain other atmospheric phenomena, such as the formation of one or other of the various modifications of cirro-stratus.

With respect to my own observations, they were principally directed to the effects of the Aurora upon the magnetic needle, and the connexion of the amount, &c., of this effect, with the position and appearance of the Aurora.

I have been anxious to confine myself to a mere detail of facts, without venturing upon any theory. My notes upon the appearances of the Aurora coincide with those of Dr. Richardson, in proving, that that phenomenon is frequently seated within the region of the clouds, and that it is dependent, in some degree, upon the cloudy state of the atmosphere.

The manner in which the needle was affected by the Aurora will need some description. The motion communicated to it was neither sudden nor vibratory. Sometimes it was simultaneous with the formation of arches, prolongation of beams, or certain other changes of form, or of activity of the Aurora; but generally the effect of these phenomena upon the needle, was not visible immediately, but in about half an hour or an hour, the needle had attained its maximum of deviation.

From this, its return to its former position was very gradual, seldom regaining it before the following morning, and frequently not until the afternoon, unless it was expedited by another arch of the Aurora operating in a direction different from the former one.

The bearings of the terminations of the arches are to be taken with considerable allowance. They were estimated by the position of the Aurora, with respect to the sides of the house, the angles of which had been previously determined. The bearings given in the whole of my observations refer to the magnetic meridian, and are reckoned from the magnetic north, towards the east round the whole circle, which, it is conceived, will afford a means of more readily computing the horizontal extent of the arches.

It is to be noticed, that the bearings given by Dr. Richardson and Lieutenant Hood are true, and not magnetic.

ON THE AURORA BOREALIS,

CUMBERLAND-HOUSE.

EXTRACTED FROM THE JOURNAL OF LIEUT. ROBERT HOOD, R.N.

The most material information we had obtained at this period regarded the height of the Aurora from the earth.

The following is the result of the observations that were made at the Basquiau Hill, and at the same time by Dr. Richardson at Cumberland-House. The instruments used for the purpose were two small wooden quadrants, revolving on pivots, and furnished with plummets. Our chronometers were previously regulated; though great accuracy was not necessary in this particular, as the arches of the Aurora are sometimes stationary for many minutes. On the 2nd of April, the altitude of a brilliant beam was 10° 0′ 0″, at 10hs. 1m. 0s. p. m., at Cumberland-House. Fifty-five miles S. S. W., it was not visible. As the trees at the latter station rose about 5° above the horizon, it may be estimated, that the beam was not more than seven miles from the earth, and twenty-seven from Cumberland-House. On the 6th of April, the Aurora was, for some hours, in the zenith at that place, forming a confused mass of flashes and beams; and in lat. 53° 22′ 48″ N., long. 103° 7′ 17″ W., it appeared in the form of an arch, stationary about 9° high, and bearing N. b. E. It was therefore seven miles from the earth. On the 7th of April, the Aurora was again in the zenith before 10° p. m., at Cumberland-House, and in lat. 53° 36′ 40″ N., and long. 102° 31′ 41″; the altitude of the highest of two concentric arches at 9hs. p. m., was 9°; at 9hs. 30m., it was 11° 30′; and at 10hs. 0m. 0s. p. m., 15° 0′ 0″, its centre always bearing N. b. E. During this time, it was between six and seven miles from the earth. After 10hs. p. m., it covered the sky at Cumberland-House, and passed the zenith at the other place.

These observations are opposed to the general opinion of meteorologists; they are nevertheless facts. We have sometimes seen an attenuated Aurora flashing across 100° of the sky in a single second; a quickness of motion

inconsistent with the height of sixty or seventy miles, the least which has hitherto been ascribed to it. This kind of Aurora is not brighter than the milky way, and resembles sheet-lightning in its motions.

For the sake of perspicuity, I shall describe the several parts of the Aurora, which I term beams, flashes, and arches. The beams are little conical pencils of light, ranged in parallel lines, with their pointed extremities towards the earth, generally in the direction of the dipping needle. The flashes seem to be scattered beams approaching nearer to the earth, because they are similarly shaped and infinitely larger. I have called them flashes because their appearance is sudden, and seldom continues long. When the Aurora first becomes visible, it is formed like a rainbow, the light of which is faint, and the motion of the beams undistinguishable. It is then in the horizon. As it approaches the zenith, it resolves itself at intervals into beams, which, by a quick undulating motion, project themselves into wreaths, afterwards fading away, and again brightening, without any visible expansion or concentration of matter. Numerous flashes attend in different parts of the sky. That this mass, from its short distance above the earth, would appear like an arch to a person situated at the horizon, may be demonstrated by the rules of perspective, supposing its parts to be nearly equidistant from the earth. An undeniable proof of it, however, is afforded by the observations of the 6th and 7th of April, when the Aurora which filled the sky at Cumberland-House, from the northern horizon to the zenith, with wreaths and flashes, assumed the shape of arches at some distance to the southward.

But the Aurora does not always make its first appearance as an arch. It sometimes rises from a confused mass of light in the east or west, and crosses the sky towards the opposite point, exhibiting wreaths of beams, or coronæ boreales, in its way. An arch, also, which is pale and uniform at the horizon, passes the zenith without displaying any irregularity or additional brilliancy; and we have seen three arches together, very near the northern horizon, one of which exhibited beams and even colours, but the other two were faint and uniform.

On the 7th of April, an arch was visible to the southward, exactly similar to that in the north, and it disappeared in fifteen minutes. It had probably passed the zenith before sun-set. The motion of the whole body of Aurora is from the northward to the southward, at angles not more thon 20° from the magnetic

meridian. The centres of the arches were as often in the magnetic as in the true meridian.

The colours do not seem to depend on the presence of any luminary, but to be generated by the motion of the beams, and then only when that motion is rapid, and the light brilliant. The lower extremities quiver with a fiery red colour, and the upper with orange. We once saw violet in the former. The number of Auroræ visible in September was two; in October three; in November three; in December five; in January five; in February seven; in March sixteen; in April fifteen; and in May eleven. Calm and clear weather was the most favourable for observation; but it is discernible in cloudy weather, and through mists. We could not perceive that it affected the weather. The magnetic needle, in the open air, was disturbed by the Aurora, whenever it approached the zenith. Its motion was not vibratory, as observed by Mr. Dalton; and this was, perhaps, owing to the weight of the card attached to it. It moved slowly to the E. or W. of the magnetic meridian, and seldom recovered its original direction in less than eight or nine hours. The greatest extent of its aberration was 45′.

A delicate electrometer, suspended at the height of fifty feet from the ground, was never perceptibly affected by the Aurora, nor could we distinguish its rustling noise, of which, however, such strong testimony has been given to us, that no doubt can remain of the fact. The conclusions to be drawn from the above will be found in the observations for the winter of 1820.

An Account of the Aurora Borealis, seen at Cumberland-House, between the 23*d of October*, 1819, *and the* 13*th of June*, 1820; Lat. 53° 56′ 40″ N. Long. 102° 16′ 41″ W. Variation 17° 17′ 31″ E.

From the 23d of October to the 25th of November, the aurora was not visible, or it did not appear before one a. m.

November 26th, at one a. m., an Aurora, arched like a rainbow, about 20° high; centre bearing north; colour pale-yellow, faint. At eight p. m., a very faint arch, centre north.

December 6th, at ten p. m., a faint-arched Aurora, centre N. b. E.

8th. A similar Aurora, centre north, at ten p. m.

December 9th, at eleven p. m., an arched Aurora, centre north; colour light-yellow, very bright.

12th. At eight p. m., an arched Aurora, centre north; colour light-yellow; faint.

January 14th, 1820, at ten p. m. Aurora faintly visible, north.

19th. An Aurora, embracing the horizon, from N.N.W. to N.N.E., about 12° high, 5° broad; faint, but permanent; twelve p. m.

20th. At eleven p. m., an arched Aurora, centre north, 15° high, and 5° broad.

27th. At ten p. m., an Aurora, 40° high, and 5° broad; usual colour, and faint; centre north.

February 2d, an Aurora, very faint; centre north, about 2° high, extending from east to west.

8th. Appearance of an Aurora, at ten p. m., in the northern horizon.

10th. An Aurora arched; centre N. b. E., about 4° high, and 30° long.

12th. At ten p. m., an arched Aurora; centre north, about 6° high. Between it and the zenith were sometimes visible, several perpendicular streams, with one extremity pointed, and declining nearly in the direction of the dipping needle. They sometimes re-appeared in the same place, which they had occupied at first. I shall, for the future, call them flashes.

19th. An Aurora across the zenith, cutting the meridian at right angles. That side of it which faced the south was a regular line; but the other streamed at intervals towards the east or west, separating itself into portions resembling the flashes, but much smaller; colour as usual; many flashes near the northern horizon. This Aurora was followed, on the 20th, by a storm of snow E.S.E.

29th. An Aurora arched, centre north; extending 60°, height 30°, breadth 5°. Towards the eastern extremity, it was broken by a quick undulating motion, into those portions described above, which I shall call beams; because they appear to tend towards a common centre, though their direction is sometimes altered when in motion; colour as usual.

March 4th, at twelve p. m., a beautiful and singular Aurora; four regular concentric arches, the outermost extending from N.N.W. to E.N.E., about 30° high, and the others at equal distances within it, the last being 7° high. Each was 3° broad; faint, but visible for three hours.

March 5th. An appearance of Aurora in the northern horizon.

6th. A large, brilliant, arched Aurora, centre N.N.E., at nine p. m. It advanced rapidly to the southward, separating into beams, and scattering many flashes. The motion of the beams was exceedingly quick, and they were bright, but of the usual colour. They ranged themselves in wreaths, forming coronæ boreales in the zenith, which faded gradually, leaving a pale undistinguished body of light, out of which they were soon again renovated, without apparent communication with any other body of the Aurora.

7th. At one a. m., the above Aurora spread over the whole sky, except a portion from S.S.E. to S.S.W.

At nine p. m., an arched Aurora, centre N.N.E. ; many flashes, which at twelve p. m. filled the northern half of the sky.

8th. an arched Aurora, centre N.N.E. It did not advance to the zenith, but separated into brilliant beams, and scattered many flashes. The motion of the beams was in wreaths, or segments of circles ; rapid, and exhibiting at the lower extremities a red-orange colour, and at the upper, faint yellow.

9th. At eight p. m., an Aurora, consisting of several arches, the highest of which was the faintest. They were almost obscured by flashes between them and the spectator.

10th. At nine p. m., an Aurora, in rapid motion, seen through breaks in the clouds.

11th. An Aurora, in many segments, from E.N.E. to W.N.W. ; beams in rapid motion, ordinary colour.

12th. At eight p. m., an arched Aurora, centre N. b. E. At ten p. m. it approached near the zenith, and broke into beams and flashes, ordinary colour.

14th and 15th. Auroræ just visible through the clouds.

16th. A bright Aurora, but almost hid by the clouds.

17th. Aurora visible through a dense haze.

18th. At twelve p. m., an arched Aurora, centre N.N.E., about 20° high, 6° broad, extending from N.W. to east.

19th. At eight p. m., an appearance of Aurora in the northern horizon.

N.B. From March 22 to April the 8th, the descriptions of the Auroræ and other observations relative to their height, have been delivered in a separate paper.

April 10th and 12th. Appearance of Aurora north.

14th. At 9 p, m., an arched Aurora, about 15° high, centre north.

15th. An arched Aurora, 16° high, centre N. b. E.

16th. Appearance of Aurora, N.N.E.

19th. At 10 p. m., an arched Aurora 25° high; centre N. b. E., extending from N.E. to N.N.W. At 11 p. m. it was 35° high, and its eastern extremity turned back upon itself, and appeared to dart a flash perpendicularly towards the earth. At 11h. 30′ p. m. several flashes reached the zenith, colour as usual.

20th. Appearance of Aurora through a thick fog.

27th. At 12 p. m., a segment of an arch, and several flashes, north; and about 30° high.

29th. Several flashes of Aurora, bearing north.

30th. At 8 p. m. an arched Aurora 30° high; centre bearing N.N.E. extremes N.E. b. E. and N.W. b. N.

May 1st. At 12 p. m., a remarkable Aurora rose from E.N.E. like the trunk of a tree, and spread forth branches all over the sky, but principally towards the South. They were composed of beams which always are distinguishable when the Aurora is much agitated; ordinary colour; many scattered flashes round the horizon.

2d. At 11 p. m., an arch across the zenith; 6° broad, and faint; extremes E. b. S. and W. b. N.

3d. At 10 p. m., an Aurora in rapid motion, seen through the clouds.

5th. At 11 p. m. an arched Aurora, very faint; centre N.N.E.

12th. At 12 p. m., the northern half of the sky was filled with a light attenuated Aurora, not more brilliant than the milky way; but flashing with such rapidity, that the eye could not follow its motion, nor determine its form.

12th. At 8 p. m., appearance of Aurora, north.

18th, Ditto.

23rd. An arched Aurora, 15° high; centre N. b. E.

28th. Appearance of Aurora in the northern horizon.

N.B. The above descriptions were taken at the times inserted; the Aurora no doubt often changed its form afterwards. Many of the faint arches, however, altered only their positions in the course of four or five hours, by approaching nearer to the zenith.

TABLE I.

OBSERVATIONS ON THE MAGNETIC-NEEDLE,

AT CUMBERLAND-HOUSE, HUDSON'S BAY,

JUNE 11, 1820.

By LIEUTENANT ROBERT HOOD, R.N.

In the month of February 1820, an Azimuth Compass was fixed in the open air, with a small minutely-divided metal arch on the edge of the card; and the diurnal variation of the needle was ascertained as noted in the following table. Many interruptions prevented a more complete series of observations; and the present will serve only to shew the amount in general, and the direction of the variation.

EASTERLY VARIATION.

FEBRUARY, 1820.						
Days.	9 A. M.	Noon.	1 P. M.	4 P. M.	8 P. M.	12 P. M.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11	° ′	° ′		° ′	° ′	° ′
12	. . . .	17 8	. . . .	17 8	. . . .	17 10
13	17 17	17 9	. . . .	17 7	. . . .	17 13
14	17 16	17 13	. . . .	17 8	. . . .	17 11
15	17 17	17 8	. . . .	17 9	17 9	17 9
16	17 17	17 13	. . . .	17 16		
17	17 17	17 11	. . . .	17 16	17 16	17 16
18	17 17	17 10	. . . .	17 9	17 10	17 10
19	17 16	17 8	° ′	17 4	17 12	17 16
20	17 15		17 11	17 9	. . . .	17 11
21	17 16		17 13	17 13	. . . .	17 15
22	17 16		17 12	17 12	17 14	
23	17 16		17 12	17 13	17 15	17 15
24	17 16		17 14	17 10	17 10	17 13
25	17 16		17 11	17 11	17 11	17 14
26	17 16		17 13	17 12	17 11	17 11
27	17 14		17 11	17 12	17 14	17 15
28	17 16		17 12	17 13	17 15	17 15
29	17 15		17 11	17 12	17 12	17 16

MARCH.						
Days.	9 A. M.	Noon.	1 P. M.	4 P. M.	8 P. M.	12 P. M.
	° ′		° ′	° ′	° ′	° ′
1	17 17	. . . .	17 14	17 12	17 14	17 16
2	17 14	. . . .	17 11	17 14	17 15	17 16
3	17 17	. . . .	17 14	17 15	17 17	17 17
4	17 18	. . . .	17 14	17 13	17 17	16 45*
5	17 14	. . . .	17 12	17 12	. . .	17 16
6	17 14	. . . .	17 8	17 8	17 13	16 38*
7	17 13	. . . .	17 7	17 7	17 10	17 10
8	17 13	. . . .	17 6	17 7	17 10	17 13
9	17 14	. . . .	17 8	17 9	17 11	17 13
10	17 14	. . . .	17 8	17 9	. . . .	16 35*
11	17 14	. . . .	17 6	17 4	17 8	17 32
12	17 13	. . . .	17 8	17 8	17 10	17 12
13	17 14	. . . .	17 10	17 10	. . . .	17 13
14	17 15	. . . .	17 10	17 12	17 12	17 12
15	17 15	. . . .	17 9	17 9	17 10	17 11
16	17 15	. . . .	17 9	17 10	. . . .	17 11
17	17 15	. . . .	17 10			
18	17 15	. . . .	17 9	17 9	17 13	17 15
19	17 14	. . . .	17 7	17 7	17 10	17 10
20	17 15	. . . .	17 9	. . . .	17 13	17 15
21	17 18	. . . .	17 10	17 11	. . . .	17 15
22	17 18	. . . .	17 10		17 11	

* See the observations at the end.

APRIL, 1820.					MAY.				
Days.	8 A. M.	1 P. M.	4 P. M.	12 P. M.	Days.	8 A. M.	1 P. M.	4 P. M.	12 P. M.
1					1	° ′ 17 16	° ′ 17 8	° ′ 17 9	° ′ 17 0*
2					2	17 34*	17 9	17 10	16 52*
3					3	17 17	17 8	17 9	17 14
4					4	17 16	17 8	17 8	17 14
5					5	17 16	17 7	17 7	17 14
6					6	17 16	17 7	17 7	17 14
7					7	17 15	17 7	17 7	17 15
8					8	17 17	17 8	17 8	17 15
9					9	17 17	17 8	17 8	17 15
10					10	17 18	17 9	17 9	17 16
11					11	17 17	17 8	17 8	17 15
12	° ′	° ′	° ′	° ′	12	17 18	17 8	17 8	17 15
13	17 14	17 9	17 10		13	17 16	17 8	17 8	17 16
14	17 13	17 8	17 8	17 11	14	17 18	17 8	17 8	17 15
15	17 15	17 8	17 10	17 14	15	17 18	17 8	17 8	17 16
16	17 15	17 9	17 11	17 14	16	17 18	17 8	17 8	17 15
17	17 16	17 9	17 11	17 16	17	17 17	17 9	17 9	17 15
18	17 17	17 9	17 11	17 15	18	17 17	17 9	17 9	17 14
19	17 16	17 10	17 12	17 28*	19	17 17	17 8	17 9	17 16
20	17 16	17 9	17 11	17 1*	20	17 18	17 8	17 8	17 15
21	17 16	17 10	17 8	17 10	21	17 17	17 8	17 8	17 15
22	17 16	17 9	17 11	17 15	22	17 18	17 8	17 8	17 16
23	17 23	17 8	17 9	17 14	23	17 19	17 9	17 10	17 33*
24	17 17	17 9	17 10	17 15	24	17 25*	17 8	17 9	17 14
25	17 17	17 10	17 12	17 14	25	17 17	17 7	17 7	17 13
26	17 16	17 9	17 9	17 14	26	17 16	17 7	17 7	17 14
27	17 16	17 9	17 7	17 13	27	17 17	17 7	17 7	17 14
28	17 16	17 8	17 9	17 14	28	17 17	17 7	17 8	16 54*
29	17 16	17 8	17 8	17 14	29	17 16	17 7	17 8	17 14
30	17 15	17 7	17 7	17 14	30	17 17	17 7	17 7	17 14
					31	17 16	17 7	17 7	17 15

* Where the figures are marked with an asterisk, the Aurora had approached, or passed, the zenith, and was doubtless the cause of the increased or diminished variation. The variation assumed for the 12th of February, is, that which was observed by Mr. Franklin in November, the coldness of the weather not afterwards permitting the use of instruments, until the month of February. It may be remarked, that the greatest variation was found between 8 and 9 A. M., and the least at 1 P.M. The needle was nearly stationary during the heat of the day; and the variation, then, gradually increased until the next morning. If the needle had not been affected by the Aurora, and by some unavoidable unsteadiness, the variations would probably have been much more regular. The most striking circumstance in these observations is, that though the needle varies, and is stationary, at the same hours here, in London, and at Sumatra, the laws which govern it are exactly reversed; the variation here being greatest at the coldest period, instead of least; and *vice versâ*. For this phenomenon, it is not, perhaps, difficult to account on Dr. Lorimer's principles.

The annual variation seems to be inconsiderable.

The variations of the dipping needle were, also, observed; but they differed very unaccountably. The amount varied from 10′ to 25′; and the dip was generally least in the morning, and greatest at 3 P.M.

No. III.

OBSERVATIONS ON THE AURORA

AT FORT ENTERPRISE,

EXTRACTED FROM THE JOURNAL OF CAPTAIN FRANKLIN.

THE forms of the Aurora Borealis, during the winter, have been so various and fleeting, that it is impossible to comprehend them in a general outline; and the inferences I have drawn on a subject, respecting which I had not prepared my mind by previous study, are offered with diffidence; but I hope the observations of the position of the needle, given in the following tables, may, together with those, made with great attention by Mr. Hood, be found useful to such persons as are more conversant with such inquiries.

The horizontal compass was placed in a firm-sheltered stand, fixed to the back wall of the house, three feet above the ground, on a northern exposure, and the dipping needle was similarly fixed to the end of the store-house, at the distance of forty feet. There was no iron near either of them, the house stands on a sand hill, and there were no large stones in its immediate vicinity *.

The horizontal compass belonged to a small variation transit, made by Dollond; and its graduated circle of one and a half inch radius, is divided into degrees, the degrees counting *from the north towards the west to three hundred and sixty*. Each degree is sub-divided to twenty, but by the assistance of a magnifying glass, I could read off accurately, to within three minutes. The horizontal position was preserved by means of a spirit level attached to the instru-

* The Kater's Compass, with which Mr. Hood made his observations, was fixed in a room on the opposite side of the house, close to a parchment window that admitted the air, and it was about twenty-four feet apart from the horizontal compass.

ment. It was twice accidently shaken, but re-adjusted each time, without being moved out of its place: these circumstances are noted in the table, and asterisks are placed against observations that were made when the bubble shewed a slight deviation from the horizontal position, the adjustment, then required, was made after the observation had been read off.

For the convenience of reading off, the compass was placed on the stand with the north end of the needle, pointing to 348° 30′ at three p. m.; and the observations, made with the graduated circle in this position, are given in the following tables, together with the temperatures, and some brief notices of the weather. It must be recollected that this point of 348° 30′, is preserved merely for the sake of referring to the original observations, and that it has no connexion whatever with the degrees indicating the bearings which will be hereafter given of the Aurora.

Before adverting to the effect of the Aurora on the needle, I must premise, that the arch-like appearance of the Aurora, noted in the daily remarks, did not always resemble a portion of a great circle; but, on the contrary, frequently crossed the zenith, without originating and terminating in opposite points of the horizon; and although the general arrangement of the parts gave the idea of an arch, yet this arch was frequently broken, and its portions disconnected.

The colour of these arches varied from grey to a lively yellow, and in clear weather, the light emitted was generally observed to be more brilliant and dense than when an opposite state of the atmosphere existed.

The horizontal bands or masses of light, mentioned in the notes, appeared indiscriminately in every quarter of the sky, and at different elevations; they more frequently originated or terminated in the magnetic east or west, but not invariably so, and we have seen them on more than one occasion begin and end in the magnetic meridian. Their light varied much in density, and was generally of a yellowish hue.

The arches and horizontal bands of Aurora occasionally separated into parts or beams, which had a quick lateral motion. At such times, the colours were generally most vivid, and now and then prismatic. The extremities of these beams did not appear to point uniformly to any particular part of the sky, but to depend entirely upon the direction of the arch which they composed.

The term "beam," used in the notes, does not always allude to the appearances just mentioned, but is also applied to the commencement of an arch

when it appears in an uniform stream of light, issuing from the horizon, and before it has attained an altitude sufficient to give it an arched form.

The arches of the Aurora most commonly traverse the sky, nearly at right angles to the magnetic meridian, but the deviations from this direction, as has been already stated, were not rare; and I am inclined to consider, that these different positions of the Aurora have considerable influence upon the direction of the needle. When an arch was nearly at right angles to the magnetic meridian, the motion of the needle was towards the west; this westward motion was still greater when one extremity of an arch bore 301°, or (about 59° to the west of the magnetic north,) that is, when the extremity of the arch approached from the west towards the magnetic north. A westerly motion also took place when the extremity of an arch was in the true north, or about 36° to the west of the magnetic north, but not in so great a degree as when its bearing was about 301°. A contrary effect was produced when the same end of an arch originated to the southward of the magnetic west, *viz.*, when it bore from about 245° to 234°; and, of course, when its opposite extremity approached nearer to the magnetic north. In these cases, I say, the motion of the needle was towards the east.

In one instance only, a complete arch was formed in the magnetic meridian; in another, the beam shot up from the magnetic north to the zenith; and in both these cases, the needle moved towards the west.

The needle was most disturbed on February 13, p. m., at a time when the Aurora was distinctly seen passing between a stratum of clouds and the earth, or at least illuminating the face of the clouds, opposed to the observer. This and several other appearances, recorded in the accompanying notes, induced me to infer that the distance of the Aurora from the earth varied on different nights, and produced a proportionate effect on the needle. When the light shone through a dense hazy atmosphere, when there was a halo round the moon, or when a small snow was falling, the disturbance was generally considerable; and on certain hazy cloudy nights, the needle frequently deviated in a considerable degree, although the Aurora was not visible at the time. Our observations do not enable us to decide whether this ought to be attributed to an Aurora concealed by a cloud or haze, or entirely to the state of the atmosphere. Similar deviations have been observed in the day-time, both in a clear and cloudy state of the sky, but more frequently in the latter case.

Upon one occasion, the Aurora was seen immediately after sunset, whilst bright daylight was remaining.

A circumstance to which I attach some importance must not be omitted. Clouds have been sometimes observed during the day to assume the forms of the aurora, and I am inclined to connect with the appearance of these clouds the deviation of the needle, which was occasionally remarked at such times.

An Aurora sometimes approached the zenith, without producing any change in the position of the needle, as was more generally the case, whilst at other times a considerable alteration took place, although the beams or arches did not come near the zenith. The Aurora was frequently seen without producing any perceptible effect on the needle. At such times its appearance was that of an arch or an horizontal stream of dense yellowish light, with little or no internal motion.

The disturbance in the needle was not always proportionate to the agitation of the Aurora, but it was always greater when the quick motion and vivid light were observed to take place in a hazy atmosphere.

In a few instances, the motion of the needle was observed to commence at the instant a beam darted upwards from the horizon. And its former position was more quickly or slowly regained according to circumstances. If an arch was formed immediately afterwards, having its extremities placed on opposite sides of the magnetic north and south to the former one, the return of the needle was more speedy, and it generally went beyond the point from whence it first started.

When the disturbance of the needle was considerable, it seldom regained its usual position before three or four, p. m. on the following day.

On February 13, at 11h 50 p. m., the needle had a quick vibratory motion between 343° 50′ and 344° 40′. This is the only occasion on which a vibratory motion was observed.

The disturbances produced by the Aurora were so great that no accurate deductions could be made respecting the diurnal variation.

I have not heard the noise ascribed to the Aurora, but the uniform testimony of the natives and of the residents in this country induces me to believe that it is occasionally audible. The circumstance, however, must be of rare occur-

rence, as is evidenced by our having witnessed the Aurora upwards of two hundred times without being able to attest the fact. I was almost inclined, last year, to suppose that unusual agitations of the Aurora were followed by storms of wind; but the more extended opportunities I enjoyed of observing it in 1821, at Fort Enterprise, have convinced me that no such inference ought to have been drawn.

The Pith Ball Electrometer, which was placed in an elevated situation in the air, never indicated an atmosphere charged with electricity.

Upon a review of the observations made upon the dipping-needle, its variations appear to be so uncertain in their occurrence, that I cannot confidently ascribe them to the influence of the Aurora.

Observations were made on the Aurora Borealis, in 1822, at Moose-Deer Island, lat. 61° 18′ 8″ N. long. 113° 51′ 35″ W., variation, 25° 40′ 47″ E. Being unwilling, however, to swell the Appendix more than necessary, I shall not insert the tables, but merely remark, that——

Although the Aurora was frequently seen there, the coruscations were seldom either brilliant or of the variable kind. They caused but little alteration in the position of the needle; the greatest deviation observed being 18′, and did not furnish grounds for any addititional inferences to those which were drawn from the observations on the Aurora made at Fort Enterprise. The display of light was generally confined to the northern part of the sky, between the true N. E. and S. W. points, usually at a low altitude; and the Aurora was observed extending to the southward on four occasions only. This, as well as the circumstance of the magnetic needle being but slightly affected by the presence of the Aurora during the winter at that place, appears to me to be deserving of notice, as affording an indication that the seat of the phenomenon lies more to the northward; and were I to venture an opinion as to its probable situation, I should say between the latitudes of 64° and 65° north, or about the position of Fort Enterprise, because the coruscations were as often seen there in the southern as in the northern parts of the sky, and I should consider that latitude the most favourable in this part of the globe for making good observations on this interesting phenomenon.

NOTICES OF THE APPEARANCES OF THE AURORA,

AT FORT ENTERPRISE,

EXTRACTED FROM CAPTAIN FRANKLIN'S JOURNAL.

THE following appearances of the Aurora Borealis were noted at the times when the position of the horizontal needle was observed, and are intended to illustrate, Table, No. II. They have been described as they appeared to the eye, without any regard to perspective. The bearings of the terminations of the arches or beams, are reckoned from the magnetic north towards the east round the whole circle.

January 12th, 1821, midnight, a very faint arch in the zenith, lying 324° and 144°. The sky cloudless.

14th. At 7h. 30′ p. m., the Aurora first appeared in a patch, bearing 279°, from which darted a slender faint beam, which passed about 4° east of the zenith, and then instantly disappeared. A horizontal stream extended from 279° to 54°, elevated about 20°. At 8h. 20′, a faint coruscation across the zenith. At 11h. 20′, a brilliant irregular wreathed arch across the zenith, from 279° to 99°, the interior motion passing rapidly from the horizon at the former bearing, to the latter. Soon afterwards this arch twisted round, so that its extremities were directed to 122° and 234°, the internal motion very rapid. At 11h. 30′, the coruscation had removed from the zenith, and appeared in a line parallel to the horizon, extending from 99° to 234. At midnight, horizontal streams from 99° to 234°, and from 279 to 234°; but the latter had the greater elevation. The needle drawn considerably to the westward. Just as I had left the instrument, a flash darted from a beam 113° towards the zenith, and instantly a different Aurora appeared tinged with the prismatic colours, having an agitated circular motion. A few seconds afterwards, a beam flashed from 279°, and united with that which shot from bearing 113°; and then a continuous, though irregular arch, was formed from the one horizon to the other, and the interior motion passed rapidly from both these extremities towards the zenith. As long as the arch continued in that direc-

tion, the needle pointed as at midnight; but in about two minutes, the arch descended towards the east, and then the needle gradually returned eastward to its zero*, in which position it remained until the coruscation had disappeared.

At 1h. a. m., Aurora visible in patches, 279° and 99°, and a beam 346°, the needle then stood at 348° 16′ having moved eastward 34′ since midnight. At 9h. p. m., January 15th, the needle had attained the usual position at that hour, the aurora then appeared in the zenith. At midnight, a waving irregular arch continued across the zenith from 279° to 99°, and a rapid interior motion passed from the former to the latter direction. Motion of the needle westward.

16th. At 12h. 20′ westward, faint streams from 99°, inclining to the westward.

20th. At 11h., an arch crossed the zenith; and at midnight, a patch appeared 54°, lying parallel to the horizon.

21st. An arch from 99° to 212°, elevation about 10°. At midnight, a broad patch in the zenith. Slender beams rose from 234° and 31°, which were prolonged to the zenith, and came almost in contact with this patch, at the same time a low arch proceeded from 279° to 54°. Between nine and midnight, the needle moved westward 32 minutes.

22nd. At 9h. p. m., an arched horizontal stream from 110° to 54°. At midnight no Aurora perceptible, yet the needle had changed its position.

23rd. 9h. p. m., a brilliant arch across the zenith, from 279° to 99°, composed of slender beams, lying parallel to each other. The motion passed from 99° to the zenith. This arch separated in the zenith. The westward part disappeared entirely, but a column of light remained at 99°, motion of the needle westward. At 12h. thick hazy weather, no Aurora visible. Needle had moved eastward.

24th. 9h. p. m., two low arches extending from 99° to 178°. At midnight, the coruscations were generally diffused over the upper part of the sky; but the streams traversed the zenith in a different direction from the course they more frequently take, and their extremities were at 54° and 234°. The most conspicuous beam, rising 245°, proceeded to the zenith, and curled

* 348° 30′, as mentioned in page 550.

round so as to point towards 335°. The next in brilliancy came from bearing 76°, which also crossed the zenith, but did not unite with the other beam. There were two other streams of light running in the same direction. The needle had moved 48′ eastward since nine, and in a contrary way to the course it usually followed when vertical arches crossed the zenith, at about 279° or 324°.

January 25th, 9h. p. m. a brilliant curve, terminations 324° and 76°, elevation about 50°. Several beams jutted from this curve, pointing towards the horizon. At 11h., a beam rose at 279°, passed over the zenith to 99°, then ran horizontally, and formed an irregular band from 99° to 171°; the portion of light at 99° was stratified by intervening layers of clouds.

27th. A beam elevated about 13°, at midnight, whilst snow was falling.

28th, 9h. p. m. An arch from 99° to 349°. At 11h. the coruscation generally diffused over the south and eastern parts of the sky, which seemed to have proceeded from a slender beam bearing 99°, from whence a flash darted to the zenith, which instantly dilated into a broad mass of light. At midnight, an elevated arch, and a low convexed stream, extended from 99° to 200°. A beam at 94° pointing towards the zenith. Needle stationary.

29th. At $11\frac{1}{4}$h., a broad arch across the zenith from 99° to 257°, and an horizontal fringed belt from 99° towards the east, at a low elevation. At midnight, the S.E. portion of the sky was occupied by a dense mass of light, which resembled an open fan, branching upwards; a stream shot from the eastern part of it, and proceeded in an arch to 290°, the centre being elevated 70°. Several patches in the zenith parallel to this arch. In two minutes afterwards the fan disappeared, and a brilliant curved stream darted forth at 110°, and shot to the westward; its centre bore 133° elevated 25°.

30th. An arch across the zenith from 302° to 121°, but the extremities did not approach either horizon by 20°.

31st. At 9h. p. m., two horizontal bands of light extended from 99° to 212°, the lowest being elevated 8°. The S.E. end was wavy, and it appeared as if several beams had been twisted together. There was also a beam at 302°, directed towards the zenith. At midnight, an elliptical arch proceeded from 99° to 279° by the south and westward, at a low elevation. Several streams issued from this band between 279° and 245°, each pointing towards

the zenith. This arch separated after a few minutes, and then two parallel arches were displayed, having the same direction. Slight motion of the needle eastward.

February 1st. At 11h. an arch across the zenith from 279° to 99° for a considerable time stationary. This arch descended to the westward a few minutes before midnight, and when at an elevation of 20 degrees it disappeared. The stars were perfectly visible through the column of light. Needle stationary.

2nd. At midnight a stream spread from 110° to 167°, ascending gradually from the horizon to an elevation of 30°. The stars appeared through the light with undiminished brilliancy.

3rd. At 9h. p. m. Aurora commenced by a brilliant arch across the zenith, from 279° to 99°, extending to each horizon, which remained stationary and motionless for several minutes. By midnight the coruscation was generally diffused over the sky. A broad brilliant band elevated 10°, extended from 99° to 200° through an arch of about 279°. An illuminated curve branched from the latter termination, which pointed to 245°, and from this bearing, a beam shot across the zenith, towards the opposite direction; but it had not proceeded above five degrees eastward of the zenith, when it suddenly turned to the north, and assumed a scroll shape. The needle immediately moved eastward, which is the same direction it had been observed to follow on January 14th, when the streams of light appeared in nearly a similar position in the zenith, namely, lying east and west true, or about 54° and 234° magnetic bearings, but in a contrary direction to that in which it had been observed to move when the arches crossed the zenith, having their extremities at 279° and 99°, or at 324° and 144°. This coruscation remained for several minutes, when the vertical arch disappeared, and a band was presented lying parallel to the horizon from 212° to 279°. Shortly afterwards, a similar band of light proceeded from 76° to 324°, and the horizon was almost encompassed with a brilliant zone, colour pale-yellow. No motion of the Aurora perceptible.

4th. At midnight, a faint slender beam arose at 290°, and flashed to the zenith; at the same instant, another proceeded from 99° to an elevation of 50°. A broad low stream of light from 76° to 346°, and a faint belt from 189° to 234°. No change was perceived in the needle.

5th. The atmosphere very dense and hazy. The needle had been disturbed in the night, and shewed this morning a considerable change of position. At midnight Aurora gleamed through the haze in two arches, the extremities 54° and 234°, and they passed the zenith. One of them turned towards the north, and the other towards the south. The needle moved to the eastward, as on February 3d and January 14th, when the Aurora appeared in a similar position.

6th. At midnight, Aurora was perceived across the zenith 279° and 99°, gleaming through a very dense atmosphere, and when snow was falling; two stars only were visible. Motion of the needle since 9h. p. m. 28′ westward.

8th. A faint stream at 99° towards the zenith.

9th. At 9h. p. m. a beam at 290°; at 11h., a broad arch traversed the zenith from 290° to 110°, which remained until 45′ after midnight, and then disappeared at bearing 99°. Motion of the needle westward.

10th. At midnight, an arch resembling a horse-shoe, the extremities of which bore 99° and 76°; from each of these points streams were projected across the zenith towards 290°, but they did not reach the opposite horizon. They were of a faint greyish-yellow colour. The stars shone brilliantly through the columns of light; moon very bright. The needle was not the least affected. I have observed that the needle is usually most disturbed by the appearance of the Aurora in dense hazy weather.

11th. At three p. m. a cloud extended in an arch from 99° to 279°, elevated 30°, which bore a strong resemblance to the Aurora, particularly at the end at 279°, from whence some beams were projected towards the zenith. The needle was not affected.

12th. At 8h. 30′ p. m. faint curved streams in the zenith. At 9h. an arch from 99° to 279°, exactly similar in shape to the cloud seen yesterday. The colour resembled the halo round the moon. The needle was not affected. At 11h. 40′ the coruscations occupied a considerable portion of the northern part of the sky lying in parallel arches from 76° to 279°. The centre one was brilliant, and the motion, resembling a volume of smoke, passed from the former bearing towards the latter. Some arches appeared in the zenith lying 65° and 245°, and flashes darted with instantaneous motion from these towards the point to which their extremities were directed. The needle betrayed a slight motion eastward. At 12h. a broad band of light from 302° to 54°, elevated 20°.

February 13th, the atmosphere was so dense this night, that the stars were completely obscured, and the edges of the moon could only be faintly traced through the haze. At nine p. m., there was not any appearance of the Aurora, and the needle rested at 348° 30′, its usual position at this hour, when undisturbed by the Aurora. At 11° 30′, faint streams of light gleamed through a large portion of the heavens, both in the zenith and near the horizon, and immediately afterwards brilliant coruscations burst forth of the most agitated kind. At 11h. 40′, a horizontal stream extended from 279° to 31°, and the interior motion, similar to rolling smoke, passed from the first point to the latter. The needle was now drawn 3° 30′ to the eastward, or as far as 345° 00′. At 11h. 50′, there appeared another stream of irregular shape, which proceeded from 279° in a line nearly parallel to the horizon, until it curled round at 9°, or near the direction of the magnetic meridian. The interior motion flashed along this stream with the utmost rapidity. The needle moved now to 343° 50′, or 4° 40′ eastward of its first position. And during the appearance of this coruscation, I perceived the needle to oscillate between 343° 50′, and 344° 40′; and it may be remarked this was the only occasion on which a vibratory motion was observed. On the disappearance of this display, brilliant semicircular curves were presented in the same quarter, ornamented with all the prismatic colours. At 11h. 55m., the needle had receded westward as far as 347° 00′. The important fact of the existence of the Aurora, at a less elevation than that of dense clouds, was evinced on two or three occasions this night, and particularly at 11h. 50m., when a brilliant mass of light, variegated with the prismatic colours, passed between an uniform steady dense cloud and the earth; and, in its progress, completely concealed that portion of the cloud which the stream of light covered, until the coruscation had passed over it, when the cloud appeared as before.

The observations of this evening seem to corroborate the remark which I had previously made—that the direction in which the needle moves, appears to depend on the position in which the streams of Aurora are placed, and the quantity of the effect upon its proximity to, or distance from, the earth. When the extremities of arches lay near the bearings of 234° and 54°, the needle moved eastward; and when near the bearings 324° and 144°, or 279° and 99°, the motion of the needle was westward. Both of these facts were shewn to-

night. At the first display, when the extremities of the arches pointed near 234° and 54°, and the interior motion followed the same direction, the needle moved eastward as far as 345° 00′; but after midnight, the coruscations ceased to appear in that direction, and at 12h. 10′ were presented in three arches, traversing the zenith, whose extremities pointed 121° and 302°: the needle then receded towards the west, and rested at 349° 30′, having varied its position 5° 40′ in the course of twenty minutes.

February 14th, at 11h. 30′ a faint low band proceeded from 110° to 178° elevated 8° degrees, and another at a higher elevation from 121° to 212°. These streams crossed each other in the bearing 155°; and it may be remarked, that this is the only occasion on which I have seen the streams to cross each other. They separated before midnight: the eastern one ascended some degrees higher, but the other remained in the same state. Cloudless sky.

15th. At 9h. p. m. Aurora across the zenith from 257° to 76°—None visible at midnight, yet the needle had moved forty minutes westward.

18th. At 9h. p. m. Aurora gleamed through the horizon in a continuous arch from 279° to 99°.

19th. At 8h. p. m. Aurora appeared to the eastward in five arches, having the same extremities at 88° and 279°; the upper arch crossed the zenith, and the others were elevated between 15° and 20°. At midnight, two concentric arches appeared through the haze, lying across the zenith, their extremities bore 65° and 245. The needle then pointed to 348° 5′, having moved 40° eastward. At 12h. 25′ a broad and more brilliant arch crossed the zenith, from 133° to 313°; the needle then moved westward 1° 5′ to 349° 10′. This change is a further confirmation of the observations on February 13th.

20th. At 9h. p. m. beams of light issued at 99°, and pointed towards the zenith. At 10h. 30′, a brilliant arch from 99° to 279°, elevated 80°, a small arch in the zenith, and several beams at 279°. At midnight, several beams arose parallel to each other, between 335° and 349°. In a few seconds, flashes were emitted from them, which first darted to the zenith, and then twisting round, shot towards a stream that had proceeded at the same instant from 212°, which they joined. The coruscation now resembled an irregular horse-shoe, composed of many slender beams of brilliant light. This display

soon passed off to the eastward, having descended to the horizon before it disappeared. The needle was not in any way disturbed after nine, from which circumstance I am induced to suppose that the Aurora was very distant. We seldom witnessed a greater variety of arches, beams, and flashes, than were displayed this night, both in the horizon and zenith. If these coruscations had passed as near to the earth as they appear to have done at other times, some effect I conceive would have been produced on the needle: the sky was cloudless.

On the following morning, it was perceived that the needle had receded two degrees eastward, and it did not regain its usual position before 4h. p. m.—At 8h. p. m. a horizontal band of faint light extended from 88° to 245° elevated 7° degrees, which remained almost stationary until midnight, at which hour two brilliant arches appeared, whose united extremities bore 279° and 76°; and a faint broad arch traversed the zenith from 279° to 88°:—needle moved eastward. Shortly afterwards, the horizon was encircled with an illuminated zone, and the northern part of the sky covered with Aurora.

22d. At 9h. p. m. a continuous arch across the zenith, from 279° to 99°, the colour pale yellow:—needle moved westward.

23d. At 9h. p. m. a low band, parallel to the horizon, extending from 302° to 346°, patches at 76°, and some faint streams in the zenith pointing to 234° and 54°:—the needle had moved eastward. At 11h. 15′ a broad brilliant arch extended from 279° to 99° across the zenith, reaching to each horizon. The needle had since 9h. receded 24′ westward. At midnight, two arches appeared, one from 54° to 324°, elevated 50°, the other from 234° to 144°—elevated 12°.

24th. At 9h. p. m. a continuous arch, through which the stars were distinctly visible, passed from 99° to 279° across the zenith, and a beam appeared parallel to this, proceeding from 99°, which terminated in the zenith. At midnight, two belts of brilliant light extended from 99°; one by the south and west, the other by the north, which encircled the horizon at an elevation of 20°, except between the points 324° and 322°: no perceptible disturbance of the needle.

26th. At midnight, a brilliant arch issued from 313°, and reached to 99°, the centre being elevated 20°. At the latter point, the coruscation curved upwards, and was then prolonged across the zenith to 200°. The stars shone

through this stream with undiminished brilliancy—the needle moved a few minutes westward.

February 27th, at 9h. p. m. two arches crossed the zenith from 76° to 279°, very broad and brilliant; the stars were distinctly visible through them. At midnight, the Aurora was diffused over a great portion of the sky. Three arches appeared parallel to each other in the zenith, whose extremities pointed to 54° and 234°, and a horizontal stream about 30° high, reaching from 302° to 31°, along which the interior motion was extremely rapid. Soon afterwards, some dense clouds overspread the sky, but the Aurora gleamed through. The needle moved near two degrees eastward after nine. It kept an easterly position until after 2h. p. m. on the next day, and then it receded 40′ in the course of an hour. The clouds were of the fleecy kind, which sailors denominate a mackarel sky. At midnight an irregular band extended from 88° to 200, at an elevation of 15°. A beam at 324° pointing towards the zenith.

March 1st, at 9h. p. m., an arch stretched from 99° to 155°. At 11¼h., when the snow was falling heavily, and a dense atmosphere obscured the stars, the Aurora appeared in an arch across the zenith, having its extremities 88° and 200°, but did not extend to either horizon. This stream disappeared before midnight. The atmosphere was then more dense, and the snow descended in larger flakes. Between midnight and the following morning, the needle was drawn 45′ to the eastward, and it did not recover its usual position before 9h. p. m. on March 2d.

2d. At 8h. 30′ p. m., Aurora appeared in a broad arch from 279° to 99°, and continued without any alteration until nine, when the needle had moved 32 minutes westward. The breadth of the arch then increased considerably, and a dark cloud passing along its middle gave an appearance of two arches. At midnight, the coruscations occupied many parts of the sky. Two faint arches crossed the zenith from 99° to 279°. A more brilliant arch extended from 76° to 290°, at an elevation of 60° degrees. Several patches between 54° and 346°, and a broad band from 279° to 223°. The needle did not evince any material change.

3d. At midnight, a slender beam at 76°, and a patch at 279°. Needle had moved 10 minutes westward since nine.

4th. At midnight, an arch across the zenith 54° and 234°, in which the interior motion ran swiftly from the former to the latter bearing. A low band

extended from 279° to 346°. Motion of the needle 10 minutes eastward since nine.

5th. A low stream from 121° to 189°, at an elevation of 10 degrees. No change in the position of the needle.

6th. The atmosphere very hazy, and snow fell. No Aurora visible, but the needle moved 30 minutes westward between nine and midnight.

7th. Dense Atmosphere. No Aurora or stars visible, but the needle moved westward 20 minutes between nine and midnight.

8th. At 6h. 30′, p. m. Aurora appeared, whilst the western horizon was tinged with the rays of the recently departed sun, in two beams from 99° extended to the zenith. At 9h. p. m., a brilliant stream from 121° to 212°, elevated 10 degrees. A beam, having a wavy form, ascended from 99° to the zenith; its colour a bright yellow; the stars were seen distinctly through it. No change in the needle. At midnight, Aurora was diffused over a great portion of the sky. A broad arch crossed the zenith, whose extremities were at 88° and 200°, but they did not reach either horizon. A band stretched from 279° to 76°, elevated 12 degrees, from which three beams were prolonged nearly to the zenith between 302° and 335°. Needle moved 1° 5′ westward.

9th. At nine, Aurora brilliant and variable; the interior motion passed rapidly from 234° to 54°. An arch across the zenith, extremities 279° and 99°. A horizontal band from 245° to 76°. No change in the needle. At midnight, some patches bearing 324°. An arch was instantly projected from that, bearing across the zenith to 144°. This arch separated in the zenith, and both parts passed off against the wind to the westward. The needle moved 30 minutes westward between nine and 11h. 30m.

11th. At 9h. p. m., a waving arch passed from 290° to 88°, about 2° east of the zenith, and reached from one horizon to the other. An elliptical arch from 313° to 76°, elevated about 50°. At 11h., two waving streams stretched from 279° to 43°, and some beams shot from both these extremities towards the zenith, but more numerously from 279°. The needle had moved 1° 8′ westward between nine and eleven. Whilst I was looking at the instrument, a flash darted towards the zenith from a low beam bearing 9°, and the needle immediately moved 8′ westward; but the arch having in a few seconds passed over to the south, the needle returned eastward to its first position. At midnight, a beam arose at 54°, darted to the zenith, and then the upper extremity turned

so as to point to 144°. Another beam darted from 257°, and joined the former one. The arch, thus formed, descended gradually against the wind. There was only a slight lateral motion perceptible while it remained across the zenith; but when it had sunk to about 60° from the horizon, an interior motion rushed from each of the extremities towards the middle, and at the place of contact the greatest commotion was excited, and the prismatic colours were exhibited. The motion of the needle 8′ minutes eastward. This arch disappeared at an elevation of 25°. Between 11h. and midnight, sounds were repeatedly heard resembling the hissing of a musket-ball, or the shaking of a thin pliant stick in the air, which were at first supposed to have been occasioned by the motion of the Aurora. Mr. Wentzel, however, who assured us that he had often heard the noise of the Aurora, said these sounds were very dissimilar to that which the Aurora makes, and that he supposed the noise to be occasioned by the cracking of the snow, in consequence of a great decrease in temperature immediately after the two preceding days of mild weather. I was of the same opinion, from the circumstance of a similar noise having been heard after midnight coming from the eastward, in which quarter there was not the least appearance of Aurora, and when only a faint motionless beam was visible to the eastward. This opinion was further confirmed on the following morning, when similar sounds were distinctly heard at the time the sun was shining bright, and there was not any symptom of Aurora.

12th. At midnight, faint streams from 88° directed towards the zenith. Some patches visible in other parts of the sky.

13th. At midnight, a beam shot from 302° across the zenith to 88°. Another extended to the zenith, whose lower extremity bore 290°. A horizontal band from 234° to 257°. The needle since nine moved 1° 25′ westward.

14th. At nine p. m. a faint beam at 99° pointing towards the zenith. At midnight a faint low stream from 76° to 110°. No change in the needle.

15th. At midnight, waving streams from 110° to 144° and from 189° to 212°, elevated 20° . No change in the needle.

16th. At 3h. p. m. some clouds appeared about 279°, which bore a strong resemblance to the Aurora, particularly one of the beams, which extended 40° towards the zenith. The needle moved 18′ westward, between 3h. and 5h. p. m.

At midnight, a faint stream of Aurora reached from 65° to 279°, elevation 25°. No change in the needle.

19th. At 9h. p. m. a faint arch from 121° to 212°, elevated 25°. At midnight, low streams from 144° to 324°, which nearly encircled the horizon. Seven beams were projected upwards, from different parts of this zone. Their points did not meet in the zenith, but terminated about 3° short of that part. The whole appearance strongly resembled an artificial globe, the zone being the equator, and the beams the meridian lines. The needle moved 25′ eastward between nine and midnight, but I observed it to move gradually westward, as these beams were disappearing. Immediately after they had ceased to be visible, an arch was exhibited crossing the zenith, in the direction of the magnetic meridian. The needle still continued to recede westward, until it rested nearly in the position at which it was at 9h. p. m.

20th. At 9h., an arch from 99° to 279°. A beam at 99° pointing towards the zenith. A stream from 257° to 290°. At midnight, a low stream from 302° to 54°, along which the interior motion passed very rapidly. The needle moved 1° westward. The sky was overspread with fleecy clouds.

21st. At 11h. a. m., some clouds lying parallel to the horizon between 346° and 76° strongly resembled the Aurora. At 9h. p. m. Aurora in a bright arch from 99° to 280°, passing within 3° of the zenith. This descended to the eastward against the wind. At midnight two beams darted from 144°; one shot across the zenith to 290°, the end of the other curved round just beyond the zenith, and, in a few minutes, both of them rushed back to 144°, and then disappeared. A waving stream reached from 279° to 99°, elevated 12°, several beams were projected upwards from this stream. A beam darted from 54° across the zenith, and immediately after this flash, the lower extremity of the beam moved round to 99°, and an arch was formed from 99° to 279°. The needle moved nearly 2° westward, between nine and midnight. At 12h. 30m., Aurora generally diffused over the sky. A brilliant arch crossed the zenith from 279° to 110°; this soon afterwards separated, so as to form three arches parallel to each other. Some beams laid at right angles to this arch, which had come from the eastern horizon or bearing 54°. No motion in the needle perceptible.

22nd. At 9h., Aurora in an arch from 290° to 88°, a bright band from 88° to 65°. At midnight, the following appearances of the Aurora were visible

through a very dense atmosphere. A beam, at 324°, elevated 15°. An arch from 234° to 121° and some short beams at 76°.

23d. At nine, two parallel arches from 313° to 76°, supported on buttreses at both extremities. The appearance resembled a bridge of light. At 11h. 30′. The northern and eastern parts of the sky were entirely free from Aurora. Some irregularly curved streams extended from 99° to 234°, and dark clouds intervened between them. At midnight three arches from 110° to 234°, the upper one most brilliant. No perceptible interior motion of the Aurora. The needle moved 10° westward after nine.

24th. At 9h. p. m. Aurora appeared through the clouds and snow, traversing the zenith in the direction of 65° and 245°. The needle moved eastward 1° 5′. At midnight, a beam from 99°, of slender breadth when near the horizon, dilated considerably in its ascent, and at its termination in the zenith spread so as nearly to cover the upper part of the heavens. Another beam arose from the same point, curved several degrees to the westward, and then proceeded to the zenith. These beams quickly disappeared, but a low arch extending from 279° to 65° remained stationary. The needle moved westward between nine and midnight 1° 22′.

25th. At 9h. p. m. faint beams at 324° and 144°. At midnight, a horizontal stream from 133°; to 223° some beams at 324°, and patches in several other parts: all very faint.

26th. At 9h. p. m. a faint Aurora at 99°. At midnight, a mass of dense light burst forth bearing 65°, at an elevation of 20°, which presently curved round, and assumed the shape of a horse-shoe; at that instant a beam flashed from 324° to the nearest part of the curve, and immediately an arch proceeded upwards, and passed about 3° eastward of the zenith. The needle moved eastward 12′.

28th. At 8h. p. m., when day-light was perceptible to the westward, a stream of Aurora issued from a dark mass of cloud bearing 110°, and proceeded upwards in the direction of 346°; but when it reached the zenith, the upper part inclined to the westward, and an arch was formed from 110° to 290°, reaching from one horizon to the other. Some smaller streams appeared about 189°, lying parallel to a range of clouds which resembled it in colour, both being a steel-grey. The extremities of these streams pointed 121° and 257°. At 9h. p.m. clear weather. Three arches appeared, one from

94° to 290°, elevated 80°, the other from 290°, passing about 2° east of the zenith, and the third went parallel to this, and united in the same points in the horizon, but they were separated in the zenith by a stream of cloud. In two minutes afterwards, the first arch disappeared, and the two others closing in the zenith, formed one broad stream, and passed off to the westward. Stars were faintly seen. At midnight, a very dense atmosphere obscured the sky; neither stars nor Aurora visible. The needle, however, moved 35′ westward between nine and midnight.

29th. A faint gleam of Aurora fringed the upper part of some dark clouds between 133° and 155°.

30th. At 9h. a broad arch across the zenith from 88° to 290°, and the interior motion was rapid. At midnight, an arch from 110° to 257°, elevated 20°; it separated in the zenith, and then the light passed instantaneously down to each horizon. Needle moved westward.

April 1st, the changes in the position of the needle this morning deserve some notice. At 8h. a. m. it was nearly in the same position as at midnight; an hour afterwards it had moved 12′ eastward, and by eleven, 10′ more. At 8h. a. m. there was a mackerel sky to the north, the strata of the clouds being vertical. Near the west horizon there was a layer of dense clouds which soon spread over the whole sky. At 11h. these dark clouds gave place to a thin fleecy sky, and many blue portions were seen. The needle then returned towards the westward, and by four had reached within two minutes of the point at which it stood at 9h. a. m. At 9h. 30′ p. m. the Aurora appeared through a hazy atmosphere, in an arch from 99° to 234°.

5th. An arch passed from 88° to 178°, at a low elevation. At midnight, an arch composed of several streams apparently blended together, issued from 110° and passed about 10° west of the zenith to the horizon at 279°. This arch separated in the zenith, and then each part passed over to the horizon at 279°. A very slender faint arch remained from 9° to 189°. The needle moved a little westward.

6th. At nine, masses of light of irregular breadth fringed the upper part of a range of clouds extending from 99° to 212°. At midnight, a waving low stream from 99° to 212°, of dense light, the motion rapid, going towards the latter bearing. Motion of the needle westward.

7th. At 9h. p. m., an arch stretching from 279° to 110°; motion of the

needle westward. At 10h. 30m., a very irregular arch from 99° to 234°. The interior motion darted rapidly in opposite directions, and the red, purple, and violet colours were exhibited. Numerous slender beams, in which there was a quick lateral motion, shot from this arch; some of them were projected to the zenith. The arch separated at 121°, and the western portion immediately rushed towards the north, preserving the same elevation; at this instant, the wind changed from north to the opposite direction, south. At midnight, a horizontal band appeared from 99° to 234°, and several beams to the southward. The needle moved eastward 27′ between nine and midnight.

8th. At 11h. 10m. p.m., various streams appeared, stratifying a dense mass of cloud. In two parts of this coruscation, the motion darted from 144 and 324° towards the zenith; in another, from 76° to the horizon at 144°. The needle had moved westward 2° 19′ since nine. At midnight, a beam rose at bearing 65°, and darted to an elevation of 30°. Nearly at the same instant, another beam issued from 9°, and joined this; and then an arch was formed, terminating in these bearings. Several other masses of light were seen to the eastward. The needle had moved eastward 1° 55′ since the last observation. Heavy dark clouds spread over a large portion of the sky.

11th. At midnight, a faint gleam of Aurora appeared through a very dense atmosphere, and when there was a halo round the moon.

13th. Atmosphere hazy, no Aurora or stars were visible, yet there was a motion of the needle 7° to the westward, between nine and midnight.

14th. A faint arch from 313° to 133° at midnight.

15th. At 9h. several brilliant beams bearing 54°, in which there was much lateral motion and a variety of colours. An arch crossed the zenith from 313° to 133°. Needle moved westward 9′. At midnight, an arch across the zenith from 290° to 110°. Another from 65° to 313°, the motion passing rapidly from the latter to the former horizon. Needle moved a little more westward.

18th. At midnight, a faint patch bore 144°.

19th. At midnight, streams of a dense pale yellow light, at a low elevation nearly parallel to the horizon, and extending from 99° to 200°. These were stationary for some hours—dark clouds lay between them.

20th. Whilst day-light remained, the Aurora was perceived fringing the upper part of a mass of dense cloud, in shape like the festoons of a

curtain. It extended from 99° to 200°. At midnight, a waving arch of low elevation from 76° to 212°. Needle had moved 45′ westward since nine.

21st. At 7h. p. m., some streams of cloud which resembled the Aurora in shape and colour crossed the zenith; but when the daylight disappeared, no Aurora was visible.

23d. At 10h. 30m. p. m., Aurora first appeared in an arch from 279° to 189°; elevation 12°. Needle moved westward 1° 11′.

27th. At midnight, Aurora appeared through the haze in two low arches, from 99° to 189°.

29th. Aurora beamed through the haze in low streams of faint yellow colour.

30th. At 11h. 40m., some patches of Aurora at 144°, elevated 20°. No motion perceptible in the needle.

May 1st. The coruscations were very agitated and brilliant between 11h. and midnight, but they did not produce any change in the needle.

3d. Midnight, Aurora proceeded from a mass of dense cloud, bearing 99°, passed near the zenith to 257°. The attenuated beams of which this arch was composed, had a quick lateral motion. Little change in the needle. Daylight in the eastern part of the sky,

5th. A faint stream proceeded from 144° to an elevation of 45°. Needle moved westward.

I did not observe any Aurora after this day, but Mr. Hood saw it on the 6th, 10th, 11th, 12th, and 13th, after which date there was constant daylight, which prevented us from seeing it.

TABLE

TABLE of OBSERVATIONS on the Deviations of the Magnetic Needle, made at FORT ENTERPRIZE, The Asterisks indicate when the Instrument required slight Adjustment. The Degrees of the

January	At 10 A.M.			At Noon			At 2 P.M.			At 3 P.M.		
1821	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather
Jan.12	° ′ 348 18	− 6½°	East, moderate, cloudy	° ′ 348 25	− 5°	East, cloudy	° ′ 348 28	−10½°	ENE. moderate, very clear.	° ′ 348 30	−14°	South, light breezes, clear.
13	348 18	−20	NE. light airs, cloudy	348 25	−16	NE. light airs, cloudy	348 25	−13	SW. light airs, hazy.	348 25	−13	West, light airs, snow.
14	348 18	−31	West, light airs, very clear	348 22	−29	WNW. lightairs, clear	348 28	−29½	WNW. light airs, very clear.	348 25	−32	West, light airs, clear.
15	347 15	−44	South, light airs, clear	347 45	−37	West, light breezes, clear	347 52	−31	West, clear, some clouds.	348 12	−27	South, light airs, cloudy.
16	348 30	−24	West, fresh b. thick clouds	348 35	−18	WSW. fresh breezes, *snow*	348 40	−15	WSW. snow.	348 40	−14	WSW. fresh b. snow and drift.
17	348 28	zero	SbW. thick cloudy weather	348 35	+ 4	WSW. light airs, *foggy*	* 349 10	+ 5	WSW. light airs, foggy.	349 15	+ 5	Nearly calm, dense fog.
18	348 15	+14	West, light airs, dense clouds	348 25	+19	NW. light airs, *snow*	348 30	+16½	SWbW. light breezes, snow.	348 30	+12	East, light b. thick cloudy atmosphere.
19	348 22	zero	East fresh b. dark and cloudy	348 30	zero	East, strong b. *drift and snow*	348 32	− 2	East, strong breezes, snow.	348 32	− 4	East, strong b. snow.
20	348 28	−21	East, fresh b. cloudy	348 30	−22	EbN. strong b. cloudy	348 35	−26	East, strong breezes, cloudy.	348 35	−29	East, modt. b. cloudy.
21	348 28	−44	West, light airs, clear	348 30	−39½	West, light breezes, clear	348 38	−38	Nearly calm, very clear.	348 40	−39	SW. light airs, very clear.
22	348 42	−48	West, light airs, hazy near the horizon, clear above	348 40	−42	West, light airs, more clear	~~~~	~~~~	~~~~~~~~~	348 45	−38	West, light airs, clear.
23	348 40	−20½	SWbW. modt. b. dark clouds	348 35	−14	WSW. moderate b. dark, cloudy	348 40	−13	WSW. dark and cloudy.	348 45	−13	WSW. modt. b. dark and cloudy.
24	346 50	−14	ENE. modt. b. dark and cloudy	347 8	−11	East, light airs, dense fog	348 25	− 8	East, light airs, very foggy.	348 30	− 7½	ENE. light b. thick weather.
25	348 10	−21	East, modt. b. very thick atmosphere	The N	eedle	was accidentally	shaken,	and	the instrument	required	to be	readjusted.
26	348 10	−20	EbN. light airs, cloudy	348 12	−18	EbN. light airs, cloudy	348 15	−15	EbN. light airs, cloudy.	348 15	−15	EbN. light airs, cloudy.
27	* 348 42	−17½	WbS. light b. cloudy	348 50	−18	Sun shone. some clouds	348 50	−17	WbS. light b. clear.	348 15	−22	WbS. light b. clear.
28	348 30	− 8	WNW. light airs, dark clouds	348 32	− 7	WNW. light airs cloudy, fog bow	348 32	− 7	WNW. light airs, hazy	~~~~	~~~~	~~~~~~~~~
29	* 348 10	−31½	NWbW. light airs, clear	348 10	−26	WNW. light airs, clear	3	~~~~	~~~~~~~~~	* 348 30	−22	WNW. light breezes, clear
30	348 30	−28	WbS. modt. b. dark and cloudy	348 30	−24	WSW. fresh b. dark and cloudy	~~~~	~~~~	~~~~~~~~~	348 32	−26	WSW. moderate, more clear
31	348 25	−35	North, light. b. very clear	348 32	−35	NE. moderate, clear, very cold	348 32	−38	NE. moderate, clear, cold	~~~~	~~~~	~~~~~~~~~

II.

Lat. 64° 28′ 24″ North, Long. 113° 6′ 00″ West, Variation 36° 24′ 7″ East, Dip. 86° 58′ 42″.

Circle of the Compass used, counted from the North towards the West to 360°.

At 6 PM.			At 9 P.M.			Aurora visible or not	At Midnight			Aurora visible or not
Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather		Position of Needle	Ther.	Winds and Weather	
° ′ 348 25	° −16	ENE. light b. clear.	° ′ 348 28	° −17	North, light b. clear.	not	° ′ 348 25	° −22	NbE. light b. clear	visible
348 22	−14	NW. light b. snow.	348 25	−11	North, light airs, snow.	not	not obs.	−12	NW. fresh b. cloudy	not
348 20	−38½	West, light airs, very clear.	348 25	−38	West, light airs, very clear.	visible	348 42 at 11¼ 348 50 at 12	−43	West, light airs, very clear	visible
~~	~~~	~~~~~~~~~	348 25	−23	West, fresh b. mottled, streaked clouds.	visible	348 52	−26	West, moderate and clear	visible
~~	~~~	~~~~~~~~~	348 30	− 6	WSW. fresh b. very dense atm.	not	348 28	− 8½	West, fresh b. clear	visible
~~	~~~	~~~~~~~~~	349 10	+10	NW. fresh b. constant snow.	not	349 10	+20	NW. fresh b. constant snow	not
~~	~~~	~~~~~~~~~	348 22	+11½	Calm, very thick.	not	348 18	+11½	West, light airs, dense haze	not
~~	~~~	~~~~~~~~~	~~~~	−11	East, strong b. snow.	not	~~~~	−12½	EbN. strong b. snow	not
~~	~~~	~~~~~~~~~	348 25	−35	East, fresh b. very clear.	visible	348 30	−38	East, modt. b. clear	visible
~~	~~~	~~~~~~~~~	348 38	−46	SW. light airs, very clear.	not	349 10 349 10 at 12h 30′	−48	SW. light airs, very clear	visible
~~	~~~	~~~~~~~~~	348 35	−26	South, modt. b. clear.	visible	348 42	−23	SWbS. fresh b. hazy	not
~~	~~~	~~~~~~~~~	348 50	−17	WSW. modt. b. dark & cloudy	visible	348 40	−17	West, light b. thick weather	not
5 P.M. 348 30	~~~	~~~~~~~~~	348 30	−11	EbN. fresh b. clear	visible	347 42	−11½	East, moderate, hazy	visible
~~	~~~	~~~~~~~~~	348 00	−24	EbS. fresh b. hazy below, clear above	visible		−23	EbS. fresh b. hazy at the horizon	visible
348 15	−15	~~~~~~~~~	348 10	−11	WNW. light b. dark weather	not	348 8	− 8	WbN. moderate breezes, snow	not
~~	~~~	~~~~~~~~~	~~~~	~~~	~~~~~~~~~	~~~~~~~~~	348 48	−16	West, moderate breezes, snow	visible
348 35	~~~	~~~~~~~~~	348 30	−18	WNW. light airs, clear.	visible	348 30	−22	WNW. light airs, clear	visible
~~	~~~	~~~~~~~~~	348 35	−30	WbN. moderate and clear	not	348 30	−31	WbN. moderate and clear	visible
~~	~~~	~~~~~~~~~	348 28	−28	WSW. moderate and cloudy	not	348 30	−28	West, moderate and cloudy	visible
348 30	−41	NEbN. moderate clear and cold	348 35	−48	NNE. light airs, clear	visible	348 28	−48	NNE. light airs, clear	visible

Feb.	At 10 AM.			At Noon.			At 2 PM.			At 3 PM.		
1821	Position of Needle	Ther.	Winds and weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather
Feb. 1	° ′ 348 28	° −47½	WbS. light airs, very clear	° ′ 348 35	° −37½	WbS. light b. clear, very cold	° ′ ~~~	° ~~~	~~~~~~~~~~	° ′ 348 33	° −37	WbS. light b. clear, cold
2	348 28	−47	WbN. light b. clear above, hazy near horizon	348 32	−42	North, light airs, clear	348 30	−39	South, light airs, clear	348 32	−41	South, light airs, clear
3	348 28	−49	NNE. light airs, very clear	348 33	−41	NNE. light b. clear	~~~~	~~~	~~~~~~~~~~	348 35	−41	NNE. light b. clear
4	348 25	−45	NE. light airs, clear	348 30	−38	SSW. light b. cloudy	348 30	−29	SW. light b. dark and cloudy	348 32	−27	SSW. light b. dark and cloudy
5	347 40	−22½	WSW. moderate dark and gloomy	347 50	−18	WSW. modt. b. snow	348 10	−17	SW. modt. b. snow	348 10	−17	SW. moderate, dark and cloudy
6	348 22	−13	East, light b. dark weather	348 28	− 8	East, light b. dark atmosphere, snow	348 25	− 6½	EbS. light b. snow	348 25	− 7	EbS. gloomy, snow
7	at 9h 349 00 at 10h 348 57	−12	NE. fresh b. dark and cloudy	348 52	−11	NE. modt. b. snow	348 50	−11	NE. fresh b. dense atmosph.	348 48	−13	NE. fresh b. snow
8	348 43	−19½	NW. fresh b. dark and cloudy	348 38	−20	NW. strong b. dark and cloudy	348 35	−21	NNW. moderate more clear	~~~~	~~~	~~~~~~~~~~
9	348 28	−41	Calm, very clear	348 25	−34	EbS. light b. hazy below, clear above	348 30	−35	SEbS. light b. mist from the Rapid	348 30	−35½	ENE. light b. clear
10	348 35	−43	SSW. light airs, clear	348 30	−37	East, light b. very clear	348 38	−36	East, light b. very clear	348 30	−36	ENE. light b. very clear
11	348 28	−37½	EbN. light b. clear	348 30	−32	ENE. light b. very clear	348 32	−30	ENE. light b. very clear	348 32	−31	ENE. light b. clear
12	348 28	−25	Calm and cloudy	348 32	−17½	Calm and cloudy	348 34	−17	ENE. light b. clear	348 34	−19	ENE. light b. clear
13	9 A.M. 348 28	−25	ENE. fresh b. some clouds, but generally clear	348 26	−17	ENE. fresh b. clear	348 26	−17	ENE. streaked clouds	348 30	−17	ENE. fresh b. streaked clouds
14	347 38	− 8	SW. light airs, thick weather, small snow	347 50	+2	SE. light b. clear, some faint clouds	348 00	zero	SE. light b. fleecy clouds	348 5	~~~	~~~~~~~~~~
15	348 22	−18½	ENE. light b. very clear	348 30	−11	NE. light b. hazy	~~~~	~~~	~~~~~~~~~~	348 33	− 8	NE. light b. hazy.
16	348 25	−10½	ENE. moderate, some clouds.	348 28	− 8	NEbE. moderate very clear	348 28	~~~	~~~~~~~~~~	348 28	− 6	NE. moderate, very clear
17	348 25	− 6	NNE. light b. thick hazy atmosphere.	348 28	zero	NNE. light b. thick weather	348 28	− 2	NNE. light b. hazy	348 30	− 2	NEbN. light b. thick weather
18	347 30	−19	NE. light airs, clear.	347 45	−15	NE. light b. clear	347 53	−15	NE. light b. clear	347 55	−17	EbN. light b. cloudy
19	348 35	−15	EbN. light b. dark and cloudy, snow, a fog bow.	348 35	− 9	East, light airs, hazy	348 40	− 9½	East, light airs, snow	348 40	−12	Snow
20	347 50	−26	NNE. fresh b. clear, cold.	348 10	−19	NbE. moderate, cloudy	348 30	−19	NbE. fresh b. cloudy	~~~~	~~~	~~~~~~~~~~
21	8 A.M. 346 52 9 346 52	−35	SbE. light b. very clear.	348 10	−25	WbN. light b. clear	348 50	−24	WNW. modt. very clear	~~~~	~~~	~~~~~~~~~~
22	347 50	−26	WbS. moderate and clear.	348 10	−20	WbS. moderate, hazy	348 28	−19	West, moderate, hazy	348 30	−21	West, hazy
23	348 25	−31	NW. fresh b. clear.	348 30	−25	NW. strong b. much drift	348 32	−23½	NW. Strong b. drift snow	348 34	−24	NW. strong b. cold

At 4 PM.			At 9 PM.			Aurora visible or not	At Midnight.			Aurora visible or not
Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather		Position of Needle	Ther.	Winds and Weather	
° ′	°		° ′	°			° ′	°		
			318 30	−43	West, moderate and clear	not	348 30	−46	WNW. light b. very clear	visible
			348 30	−48	East, light airs, very clear	not	348 28	−50	NNE. light airs, clear	visible
			348 36	−47	NNE. light b. clear	visible	348 18	−49	NNE. light b. clear	visible
			348 28	−25	SSW. moderate and cloudy	not	348 30	−26	West, light b. more clear	visible
			348 8	−17½	Nearly calm, snow	not	347 55	−22	ESE. light airs, dense hazy atmosphere	visible
			348 25	−10	East, fresh b. dark weather	not	348 53	− 8	East, moderate, thick weather, small snow	visible
			348 45	−17	NNE. modt. b. thick weather	not	348 43	−17	NNE. light b. snow	not
348 33	−25	NNW. light b clear	348 30	−33	West, light airs, very clear	not	348 33	−38	WSW. light b. very clear	visible
348 33	−36	ENE. light b. clear	348 30	−45	NE. light b. clear	visible	348 38	−45	NE. light b. very clear	visible
348 30			348 30	−42	EbN. light b. clear	not	348 30	−43	EbN. light b. very clear	visible
348 33	−31	ENE. moderate and clear	348 30	−32	NE. moderate, streaked clouds	not	348 32	−33	NE. moderate, streaked clouds	not
348 35	−22	ENE. light b. clear	348 33	−24	NE. moderate and hazy	visible	348 26	−26	NE. moderate, some clouds	visible
348 30	−19½	ENE. fresh b. cloudy	348 30	−17	East, moderate and hazy	not	h m 345 00 11 40 343 50 11 50 347 00 11 55 349 30 12 10 349 10 12 35	−17	East, modt. b. atmosphere very dense, stars not visible	visible
348 8	− 5	South, light b. dark clouds	348 10	−15	calm, fleecy clouds	not	348 8	−21	EbN. light airs, very clear	visible
348 32	−10	NE. moderate, clear	348 28	−12	East, fresh b. cloudy	visible	349 8	−11	ENE. fresh b. and cloudy	not
348 30	− 9	NE. moderate, clear	348 30	− 9	calm, thick hazy atmosphere	not	348 30	− 8	NNE. light b. thick and hazy	not
348 30	− 6	NNE. hazy	348 25	−12	NNE. light airs, hazy	not, halo round the moon	348 25	−15	ENE. light b. very hazy	not
348 8				−21	EbN light b. hazy	visible		−19	hazy	not
348 40	−14	East, light b. dark and cloudy, snow	348 45	−23	North, moderate, hazy	visible	348 5 349 10 at 12h 25m	−13	ENE. light b. hazy and snow	visible
348 50	−24	NNW. moderate and clear	348 50	−34	NbE. light b. clear	visible	348 50	−36	NbE. light b. clear	visible
348 50	−25	NWbW. modt. very clear	348 50	−33	WbN. moderate and clear	visible	348 22	−33	WbN. moderate and clear	visible
348 30	−22	moderate, hazy	348 38	−24	NW. fresh b. hazy	visible		−26	fresh breezes, hazy	
348 40	−26	NW. strong b.	348 28	−29	NW. strong b. cloudy	visible	348 52	−28½	NWbW. fresh gales, cloudy	visible

Feb.	At 9 AM.			At Noon.			At 2 PM.			At 3 PM.		
1821	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather
Feb.24	° ′ 348 20	—18	WSW. light b. cloudy	° ′ 348 26	—13	WSW. light b. snow	° ′ 348 30	—15	WSW. light b. snow	° ′	°	~~~~~
25	348 20	—24	South, light airs, clear	348 30	—17	South, light airs, clear	348 32	—16	South, light airs, clear	348 32	—18	Calm and clear
26	348 25	—12	NW. moderate, dark and cloudy	348 32	— 7½	NbW. fresh b. cloudy	348 35	— 7½	North, moderate, very clear	348 34	— 8	North, moderate and clear
27	348 15	—22	WbN. moderate, clear	348 22	—22	NW. fresh b. clear	348 22	—20	NbE. fresh b. clear	348 26	—23	NbE. moderate, very clear
28	8 A.M. 347 20 9 347 40	—31	Calm, very clear	347 50	—27	WSW. light b. clear	347 50	—26	North, mackerel sky	348 30	—28	North, light airs, clear
Mar.1	348 25	—44	WbS. light b. misty near the horizon	348 25	—31	WSW. light b. clear	348 25	—30	SW. moderate and clear	348 28	—27	SW. fresh and cloudy
2	8 347 40	—26	SW. fresh b. thick weather	347 53	—17	SW. moderate, dense haze	347 55	—15	SW. moderate and hazy	347 56	—17	SW. more clear
3	348 26 at 9	—23	NE. moderate and cloudy	348 30	—12	ENE. moderate, dense atmosp.	348 30	— 6	SE. moderate, more clear	~~~~	~~~	~~~~~
4	348 10 at 9 at 8	— 1	East, light b. cloudy weather	348 25	+10	ESE. light b. dark and cloudy	348 28	+11¼	EbS. light airs, cloudy	348 33	+12	EbS. light airs, cloudy
5	347 10 9 347 20	zero	EbS. light b. dark and cloudy	348 5	+ 8	ENE. light and cloudy	348 15	+ 9½	East, more clear	~~~~	~~~	~~~~~
6	348 40 at 9	zero	East, light airs, foggy	348 48	+14	Calm, foggy	348 48	+15	Calm and foggy	~~~~	~~~	~~~~~
7	348 55	— 5	Calm, dark clouds	348 50	+ 6	SW. light b. dark and cloudy	The observations discontinued,			348 53	+ 2	North, light airs, small snow
8	347 35	zero	SE. light b. and clear	348 25	+ 8	SE. light b. and clear	~~~~	~~~	~~~~~	348 28	— 2	Calm and clear
9	347 50	— 6	SE. light b. constant snow	11 348 00 noon 348 10	+ 8	SE. constant snow	~~~~	~~~	~~~~~	348 30	+10	Snow ceased
10	348 40	—10	WbS. light airs, some clouds	348 45	— 2	West, light b. dark clouds	~~~~	~~~	~~~~~	~~~~	— 3	Clouded atmosphere
11	347 30	—18	NWbW. strong b. clear & cold	11 348 00 12 348 8	—18	NWbW. strong breezes, clear and cold	~~~~	~~~	~~~~~	348 22	—22	Strong breezes, very cold
12	348 50	—35	WbN. moderate, clear and cold	348 18	—23	West, moderate and clear	~~~~	~~~	~~~~~	348 30	—20	SW. moderate, clear
13	348 12	—32	NbW. fresh b. clear and cold	348 15	—25	North, moderate and clear	~~~~	~~~	~~~~~	348 20	—26	WSW. light b. clear
14	348 12	—25	WbN. fresh b. hazy, cold	348 22	—13	WbN. strong b. much drift	~~~~	~~~	~~~~~	348 25	— 9	WbN. strong b.
15	348 00	—19	SW. light b. very clear	348 8	—10	WbS. light and clear	~~~~	~~~	~~~~~	348 30	— 8	NW. light b. clear
16	348 10	—17	WSW. light b. cloudless sky	348 15	— 1	WSW. cloudless sky	~~~~	~~~	~~~~~	348 33	— 1	WNW. light b. cloudy
17	348 40	—23	West, light airs, sky free from clouds	348 48	—18	NW. light airs, clear	~~~~	~~~	~~~~~	348 50	—11	NW. light airs, clear
18	348 12	—21	Calm and clear	11 348 25 348 35	—14	NWbN. light b. streaked clouds	~~~~	~~~	~~~~~	348 45	—17	North, streaked clouds
19	348 40	—31	Calm and clear above, hazy near horizon	348 30	—18	East, light b. clear	~~~~	~~~	~~~~~	348 35	—19	East, light b. clear

At 4 PM.			At 9 PM.			Aurora visible or not	At Midnight			Aurora visible or not
Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather		Position of Needle	Ther.	Winds and Weather	
° ′	°		° ′	°			° ′	°		
348 30	—22	Calm and clear	348 25	—17½	SW. light airs, thick and hazy, snow	not	348 28	—15	SW. moderate, snow	not
348 35	—12	Some streaked clouds	348 30	—17	North, light b. hazy	not	348 33	—19	Nearly calm, clear	visible
5 p. m. 348 23	—26	NW. moderate, clear	348 20	—32	NW. moderate, clear	visible	346 30	—32	NW. moderate, clear	visible
348 34	—33	North, light airs, very clear	348 40	—43	WSW. nearly calm, clear	not	348 40	—45¼	North, light airs, clear	visible
348 26	—30	WbS. moderate, hazy	348 22	—30	WbS. moderate, hazy	visible	348 25	—27	SW. moderate, dense atmosphere, snow	not
5 p. m. 347 58	—26	WbS. moderate, clear	348 30	—27	SW. moderate, clear	visible	348 26	—32	EbS. light b. very clear	visible
338 34	—10	ESE. moderate, clear	348 30	—12	ESE. light b. clear	not	348 40	—12	Nearly calm, and clear	visible
348 40	+ 7	Calm and clear	348 50	zero	North, fresh b. and cloudy	not	348 40	— 4	North, moderate and cloudy	visible
348 22	+ 6½	Dark clouds	348 25	— 1	Calm and clear	not	348 25	— 5	East, light airs, clear	visible
348 48	+ 8	East, light b. cloudy	348 40	+ 2	East, fresh b. hazy	not	349 10	— 5	East, dense clds. small snow	not
At Five P.M. 348 55	— 5	NNW. light b. dark and cloudy	348 50	— 9½	ENE. modt. b. dark and cloudy	not	349 10	— 8	ENE. light b. dense clouds	not
348 30	— 6	Calm and clear	348 30	—17	NW. light airs, very clear	visible	349 35	—21	East, light airs, cloudy	visible
348 40	+12	Cloudy	348 40	+ 5	NW. moderate, cloudy	not	at 11 30 349 10 midnight 349 10	— 3	NWbW. fresh b. clear	visible
348 50	— 3	West, light b. dark and cloudy	~~~~	— 2	NW. strong b. cloudy	~~~~~~~~~~	~~~~	— 7	NW. strong b. cloudy	visible
348 25	—28	NWbW. strong breezes, clear	348 30	—35	NEbN. fresh b. clear	visible	at 11 30 349 38 349 45 349 38 at midn. 349 30	—39 —39	West, light b. clear, SW. ditto, ditto	visible
348 38	—25	SW. moderate and clear	348 50	—26	WbN. fresh b. hazy	not	at 11 15 348 55	—29	WNW. modt. hazy	visible
348 28	—28	WSW. light b. and clear	348 25	—36	West, moderate, hazy	not	349 50	—32	SW. moderate, hazy	visible
348 22	—10	NW. strong b. cloudy	348 20	—15	NW. strong b. hazy	visible	at 11 10 348 20	—17	North, strong b. hazy	visible
348 40	—10	WNW. light b. very clear	348 40	—16	North, light, clear	not	348 38	—17	NNW. light b. clear	visible
348 50	—10	NWbN. light b. clear	348 50	—20	WbN. light b. clear	not	348 50	—25	NWbN. light b. clear	visible
348 45	—18	NW. light airs, clear	At 10 348 55	—28	Calm, clear	not	348 52	—31	NWbN. light b. clear	not
348 45	—19	North, light and clear	348 56	—30	West, light b. clear	not	~~~~	~~~~	~~~~~~~~~~	not
348 45	—22	East, light b. clear	348 50	—32	NE. light b. clear	visible	348 15 to 348 52	—35½	NE. light b. hazy	visible

March	At 8 A.M.			At Noon.			At 3 P.M.		
1821	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather
March 20	° ′ 348 00	—31°	NE. light breezes, clear	° ′ 348 20	—18°	NE. light breezes, clear	° ′ 348 38	—13°	NE. light breezes, clear
21	348 10 at 10¾ 348 20	—29	NE. light airs, clear	348 30	— 9	West, light airs, clear	348 32	— 8½	West, light airs, clear
22	348 18	—17½	Calm and clear	348 26	— 6	SWbW. light airs, some clouds	348 40	— 5	SWbW. some faint clouds
23	348 40	—15	WSW. light breezes, clear	348 40	—10	NWbN. light breezes, clear	348 46	— 9	NW. moderate breezes
24	347 35	—17	WbN. fleecy clouds, small snow, light airs	347 56	— 2	South, light airs, snow	348 25	+ 5	SbE. light airs, thick weather
25	348 45	—12	Calm and clear	348 43 at 1 348 46	— 3½	EbS. light airs, clear	~~~~	~~~	~~~~~~~~~~~~~~
26	7 A.M. 348 30	—20	SbW. light airs, clear	348 33	+ 2	West, light airs, clear	348 36	+ 5	West, light airs, clear
27	348 45	— 7	East, light airs, cloudy	348 33	+17	EbS. light breezes, dark weather	348 30	+16	East, light breezes, dark weather
28	348 45	+12	ENE. moderate, dark, with snow	348 45	+21	ENE. fresh breezes, snow	348 50	+16	ENE. fresh breezes, snow
29	348 50	+ 9½	ENE. moderate, fleecy clouds	348 54	+21	ENE. light snow	348 52	+19	ENE. light breezes, fleecy clouds
30	348 50	+15	ESE. fresh b. dense haze, snow	11 348 52 12¼ 348 46	+27 +28	South, haze over-spread the sky	348 50	+22	ESE. moderate, light snow
31	* 348 10	+12	SSW. light airs, cloudless	348 18	+24	SbW. moderate b. very clear	348 22	+22	SE. fresh breezes, clear
April 1	349 8 at 9h 348 56	+17 +25	West, mackerel sky, dense clouds	11 348 46 12 348 50	+40	WSW. fleecy clouds, Sun appearing at intervals	348 54	+40	Calm, clouded sky
2	348 55 10½ 348 50	+10 +26	Calm, cloudless sky, dense clouds	348 50	+25	East, light airs, cloudy	348 50	+21	EbS. moderate, very hazy
3	348 50 11h 348 53	+17	EbS. moderate, dense clouds, more clear	348 48	+28	EbS. light breezes, fleecy round clouds	348 50	+20	East, light breezes, fleecy clouds
4	348 45	+12	WbS. light airs, dark & cloudy, small snow	348 48	+30	WbS. light airs, dark clouds, snow	348 50	+26	WbS. dense clouds
5	348 50	+ 6	NbW. moderate, fleecy clouds, snow	348 50	+11	NbW. moderate, more clear	348 50	+10	NNW. light breezes, clear
6	at 7 A.M. 348 50	— 9	NWbN. fresh breezes, some clouds	348 42	zero	WNW. fresh breezes, streaked clouds	348 40	— 1	WNW. fresh breezes, fleecy clouds
7	* 348 15	—12	NbW. fresh breezes, clear	348 15	— 5	North, fresh breezes, clear	348 25	— 5	NbW. fresh breezes, clear
8	348 40	+11	East, light airs, clear	348 38	+10	WSW. light breezes, clear	348 38	+18	SW. fresh breezes, streaked clouds
9	348 40	+14	WSW. moderate, cloudy	348 48	+21	WNW. light breezes, fleecy clouds	~~~~	~~~	~~~~~~~~~~~~~~
10	348 36	+10	Calm, cloudy small snow	348 42	+20	Calm, some clouds	348 35	+10	North, light breezes, streaked clouds
11	348 30	zero	NNW. light breezes, very clear	348 28	+ 8	NNW. light breezes, very clear	348 30	+10	NNW. light breezes, clear
12	348 25	— 2	NE. moderate, dark clouds	348 30	+ 9	NbE. moderate, cloudy	348 28	+ 7	NbE. moderate, clear
13	348 30	— 9	NNE. fresh breezes, clear	348 30	—10	NE. strong breezes, very cold	348 33	—11	NE. fresh breezes, clear
14	348 28	—17	NNW. fresh breezes, cloudy	348 35	—12	NNW. fresh breezes, very cold	348 35	—10	NWbN. fresh breezes, clear

At 5 PM.			At 9 PM.			Aurora visible or not	At Midnight			Aurora visible or not
Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather		Position of Needle	Ther.	Winds and Weather	
348° 52′	—19°	NE. light breezes, clear	348° 52′	—29°	NE. light airs, clear	visible	349° 52′	—33°	NE. light airs, fleecy clouds	visible
348 32	—12	WbS. light breezes, clear	348 33	—22	SSW. some clouds near the horizon	visible	350 30 at 12½ 350 30	—22	SSW. clear above, cloudy near the horizon	visible
348 45	—10	NWbN. light breezes, clear	348 42	—19	WNW. light breezes, clear	visible	348 45	—20	WbS. light airs, thin haze	visible
348 46	—13	NW. moderate, clear	348 42	—20	NW. fresh breezes, clear	visible	348 52	—23	NW. fresh breezes, clear	visible
348 33	— 2	SbE. Light airs, thick weather	347 28	—11	SbE. light airs, snow	visible	348 50	—17	NE. light airs, clear	visible
348 45	— 5	EbN. light airs, clear	348 46	—22	Calm, clear	visible	348 50	—24½	Calm and clear	visible
348 40	— 1½	Calm, clear	348 42	—17	Calm, cloudless sky	visible	348 30	—20	Calm, cloudless sky	visible
348 40	+12	EbS. light breezes, cloudy	348 38	+ 7	ESE. moderate, heavy snow	not	358 38	+ 5	East, moderate, heavy snow	visible
348 50	+10	NEbE. fresh breezes, clear	348 50	— 2	NEbE. fresh breezes, clear	visible	349 25	— 5	NEbE. fresh breezes, dense and hazy	not
348 50	+15	ENE. light breezes, cloudy	348 52	+10	East, moderate, dense clouds, snow	not	348 50	+10	ESE. moderate, hazy	visible
348 53	+18	ESE. snow	348 53	+11	ESE. light breezes, dark and cloudy	not	348 53	+12	SEbS. moderate, dense haze	not
348 23	+21	SE. light breezes, clear	348 30	+12	Calm, clear	visible	a 1h. 30 A.M. 349 10	+ 5	Calm, clear	visible
348 54	+38	Calm, dense atmosphere	348 55	+15	Calm, hazy	not				
348 55	+19	EbS. moderate, dense clouds	348 55	+19	EbS. fresh breezes, clouded sky	not	348 53	+18	EbS. fresh breezes, dark, cloudy	not
348 50	+21	SSE. fleecy clouds	348 50	+10	Calm, clouds overspread the sky	not	at 2 A.M. 348 53	+10	Calm, hazy	not
348 53	+20	WbN. light breezes, fleecy clouds	348 52	+17	WNW. modt. b. dark & cloudy, small snow	not	348 53	+ 2	NW. moderate b. snow	not
348 50	+ 8	NW. light breezes, clear	348 52	+ 5	NNW. light breezes, clear	visible	348 55	— 7	NWbN. moderate, clear	visible
348 48	— 2	WNW. fresh breezes, clear	348 48	—10	NW. fresh breezes, cloudy	visible	348 53	—13	North, moderate, cloudy	visible
348 50	~~~	~~~~~~~~~~~~	349 25	—14	North fresh breezes, clear	visible	348 52	—19	Calm, clear	visible
348 46	+ 9	SbW. moderate, streaked clouds	348 46	+ 2	SW. strong breezes, cloudy	not	11h. 10′ 351 5 12 349 10	+ 2	SW. strong breezes, dark fleecy clouds	visible
348 50	+20	Calm, fleecy clouds	348 50	+ 6	North, light breezes, fleecy clouds	not	348 50	+ 7	Calm, summer clouds	not
348 35	+ 8	NNE. moderate, cloudy	348 35	zero	NE. fresh b. halo round the moon	not	~~~~	+ 7	North, fresh breezes hazy	
348 33	+ 8	North, light airs, clear	348 33	— 6	West, light breezes, streaked clouds	not	348 35	— 8	WbN. light breezes, hazy	visible
348 30	+ 5	NNW. moderate, clear	348 30	zero	NNW. hazy, halo round the moon	not				
348 30	— 6	NW. fresh breezes, very cold	348 33	—15	West, moderate, hazy	not	348 40	—18	NW. moderate b. hazy	not
348 40	—15	NWbN. fresh b. clear	348 48	—27	North, strong breezes, clear	not	348 50	—31	East, light breezes	faintly visible

April	At 7 A.M.			At Noon.			At 3 P.M.		
1821	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather
April 15	348° 00′	—24°	ENE. fresh breezes, clear	348° 8′	—15°	ENE. fresh breezes, clear	348° 18′	—14°	Moderate, clear
16	347 40	—14	Calm, clear	348 15	— 5	EbS. light airs, clear	348 25	— 5	EbS. light airs, clear
17	348 20	—15	ENE. fresh breezes, snow	348 38	— 3	East, strong breezes,	348 45	— 4	East, strong breezes, cloudy
18	348 33	— 5	EbS. light breezes, very clear	348 35	+11	East, light breezes, snow	348 45	+ 9	East, modt. breezes, dark
19	348 33	+18	Calm, snow	348 35	+21	Calm, snow	348 43	+ 4	ENE. light breezes, clear
20	348 15	— 1	East, light breezes, very clear	348 00	+ 7	SbE. light breezes, very clear	348 10	+ 9	SbE. light breezes, very clear
21	349 15	+15	Calm, foggy	348 55	+38	SbW. light breezes, clear	348 52	+28	SWbS. light breezes, mottled sky
22	348 40	+28	SSW. light breezes, snow	348 35	+43	South, light breezes, snow	348 40	+27	WNW. moderate, snow
23	347 40	— 2	ENE. moderate, cloudy	348 5	+ 3	NE. moderate, cloudy	348 18	+ 5	NE. moderate, clear
24	349 26	zero	NE. light breezes, fleecy clouds	349 26	+29	East, light breezes, summer clouds	349 26	+22	EbN. fresh breezes, cloudy
25	349 20	+16	East, light breezes, summer clouds	349 20	+31	ENE. moderate, fleecy clouds	349 20	+30	ENE. light breezes, cloudy
26	349 20	+15	East fresh breezes, cloudy	348 42	+27	East, fresh breezes, cloudy	348 50	+20	East, strong breezes, cloudy
April 27	348 23	+18	East, fresh breezes, snow	348 45	+27	East, moderate b. clear	348 43	+27	NE. light breezes, cloudless
28	348 33	+15	East, light breezes, dark, snow	348 33	+31	NEbE. light breezes, dark clouds	348 43	+27	NEbE. light breezes, dark clouds
29	348 33	+15	ENE. moderate b. snow	348 45	+25	NNE. moderate, small snow	348 46	+26	NE constant snow
30	348 46	+18	ENE. light breezes, clear	348 53	+32	NE. light airs, cloudless	348 52	~~~	~~~~~~~~~~~~~~~~
May 1	346 55	+24	SSW. light airs, cirro stratus	347 20	+14	SE. strong breezes, clouded	348 00	+40	SE. strong gales
2	348 15	+45	Calm, dark clouds	348 22	+46	WSW. fresh breezes, snow	348 22	+40	WSW. fresh breezes, more clear
3	348 18	+24	West, light breezes, streaked clouds	348 22	+36	SEbE. moderate b. light clouds	348 26	—42	SEbS. light breezes, clear
4	348 30	+38	ESE. light airs, thick weather	348 30	+49	ESE. light breezes, cloudy	348 30	+35	WSW. strong breezes, heavy clouds
5	348 35	+28	SE. light airs, very clear	348 40	+42	SbE. moderate b. very clear	348 40	+46	~~~~~~~~~~~~~~~~
6	at 6 347 26 at 8 347 40	+35	SW. light airs, very clear	347 50	+45	Calm, clear	348 25	+42	SEbS. moderate, clear
7	348 12	+34	ENE. light breezes, dark	348 18	+41	EbN. moderate, dark clouds	348 20	+39	~~~~~~~~~~~~~~~~
8	348 15	+30	ESE. light breezes, dark clouds	348 25	+36	NE. light breeezes, cloudy	348 25	+34	NEbN. light breezes, fleecy clouds
9	348 20	+18	ESE. moderate b. clear						

At 5 PM.			At 9 PM.			Aurora visible or not	At Midnight.			Aurora visible or not
Position of Needle	Ther.	Winds and Weather	Position of Needle	Ther.	Winds and Weather		Position of Needle	Ther.	Winds and Weather	
348 33	−14	East, moderate b. clear	348 42	−24	East, moderate b. clear	not	348 45	−32	SSW. light breezes, clear	visible
348 28	− 6	EbS. light breezes, clear								
348 30	− 4	East, strong breezes, very cold	~~~~~	−13	North, strong breezes					
348 46	+ 7	ENE. moderate b. snow	348 42	− 6	NE. light airs, clear	~~~~~	348 45	− 7	Calm, clear	
348 46	+ 2	ENE. light breezes, clear	348 48	−12	NNW. light clear	~~~~~	348 45	−20	Calm, clear	visible
348 18	+ 8	ENE. light breezes, clear	348 35	+15	Calm, cloudless	visible	349 20	+20	Calm, cloudless	visible
348 50	+22	Calm, clear	348 53	+ 5	NbW. light streaked clouds	not	348 53	+ 7	South, light breezes	not
348 36	+20	NWbN. moderate, dense clouds	348 50	zero	North, fresh breezes, clear	not	~~~~~	− 4	NEbE. strong b. cloudy	not
348 22	− 2	NE. moderate b. clear	348 22	−14	ENE. moderate, cloudless sky	~~~~~	349 33	−17	EbN. light breezes, clear	visible
349 30	+17	East, moderate, cloudy	349 30	+ 6	West, moderate, dark clouds	not	349 33	+ 8	North, moderate, cloudy	not
349 20	+22	ENE. moderate	349 28	+13	ENE. moderate, dark clouds	not	349 28	+13	East, dense clouds	not
348 45	+18	East, streaked clouds	348 50	+10	ENE. strong breezes, cloudy	not	348 50	+10	NE. fresh breezes, dark clouds	not
348 40	+26	ENE. moderate b. hazy	~~~~~	+ 9	ENE. light breezes, cloudy	not	349 30	+ 6	ENE. light breezes, hazy	visible
348 46	+20	NEbE. light breezes, dark clouds	348 50	+13	NbW. moderate, cloudy	not	~~~~~	+12	North, fresh breezes, dark clouds	not
348 43	+23	ENE. moderate, snow	348 40	+12	ENE. moderate, snow	not	348 40	+12	NE. moderate, snow	visible
348 53	+26	ENE. light airs, cloudless	348 55	+ 6	ENE. light airs, cloudless	not	348 53	+ 4	SE. light airs, clear	visible
348 40	+37	SE. mackerel sky	10 P.M. 348 53	+29	SE. strong breezes, cloudy	not	348 53	+29	SE. strong breezes, cloudy	visible
348 26	+37	WbS. light breezes, cloudless	348 28	+30	~~~~~	not	348 25	+25	WbS. cloudless sky	not
348 25	+39	SEbE. moderate b. clear	348 25	+32	ESE. moderate b. clear	not	348 28	+25	East, fresh breezes, some clouds	visible
348 32	~~~	~~~~~	348 33	~~~	~~~~~	not	348 35	~~~	~~~~~	not
348 40	+46	South, light airs, clear	348 40	+32	South, light airs, clear	not	348 46	+28	West, light airs, very clear	visible
348 30	+43	SEbS. some clouds	348 26	+29	East, light breezes, cloudy	not	348 28	+29	EbS. small snow	not
348 22	+36	EbS. light breezes, hazy	348 26	+31	EbS.	not	348 25	+31	EbS. light breezes, hazy	not
348 25	+34	WbS. light breezes, clear	348 26	+21	EbS. moderate, clear	not	348 25	+21	NE. moderate b. very clear	not

ON THE AURORA BOREALIS

AT FORT ENTERPRISE,

EXTRACTED FROM THE JOURNAL OF LIEUTENANT ROBERT HOOD, R. N.

During the summer of 1820, the Aurora was only once visible before the month of August, when the nightly temperature of the air was generally below 50°. The late continuance of day-light, and the few opportunities which we had of making observations at the most favourable hours, render it possible that the Aurora may have sometimes appeared, in this long interval, without our knowledge. But those opportunities were sufficiently numerous to convince me, that it is actually very seldom present in these regions during the summer.

The number of Aurora visible in August 1820, was ten; in September six; in October seven; in November eight; in December twenty; in January 1821, seventeen; in February twenty-two; in March twenty-five; in April eighteen; and in May, the brightness of twilight prevented us from seeing more than nine. The whole amount is more than double the number of our observations at Cumberland-House. It is worthy of remark, that the number of Auroræ in each month of both the winters, bears some proportion to the thermometrical range. The shapes of the Aurora at its entry into the horizon, and progress through the sky, may be reduced under two general descriptions. In the first, I shall class those which are formed like rainbows or arches, in the earliest stage of their appearance. They rise with their centres, sometimes in the magnetic meridian, and sometimes several degrees to the eastward or westward of it. The number, visible at the same time, seldom exceeds five, and is seldom limited to one. The altitude of the lowest, when first seen, is never less than 4°. As they advance towards the zenith, their centres (or the parts most elevated,) preserve a course nearly in the magnetic meridian, or parallel to it. But the eastern and western extremities vary their respective distances, and the arches become irregularly broad streams in the zenith, each dividing the sky into two unequal parts, but never crossing one another till

they separate into parts. Those arches, which were bright at the horizon, increase their brilliancy in the zenith, and discover the beams of which they are composed when the interior motion is rapid. This interior motion is a sudden glow, not proceeding from any visible concentration of matter, but bursting out in several parts of the arch, as if an ignition of combustible matter had taken place, and spreading itself rapidly towards each extremity. In this motion the beams are formed, such as are described in the last observations upon the subject. They have two motions, one at right angles to their length or sideways; and the other, a tremulous and short vibration, in which they do not exactly preserve their parallelism to each other. By the first, they project themselves into wreaths, serpentine forms, or irregular broken curves. The wreaths, when in the zenith, present the appearance of Coronæ Borealis. The second motion is always accompanied with colours; for it must be observed, that beams are often formed without any exhibition of colours; and I have not, in that case, perceived the vibratory motion. The beams, in different Auroræ, and sometimes in the same, are of different magnitudes, arising, probably, from their various distances. These evolutions, often repeated, destroy the shape and coherence of the several arches; though they, doubtless, retain the arched appearance to the eye of a spectator at the southern horizon. For it would be absurd to suppose, that these changes occur only in the zenith of one particular place. The observations, at different places, in 1820, afford satisfactory proof to the contrary. And the number of arches often increased or diminished, in their advance to the zenith, by a dismemberment of which, from their distance, we could not distinguish the particulars. However, their several parts passed gradually to the southward, where I have seen them reassume the form of an arch. They are also sometimes distributed into flashes, and other detached portions, which pass to the south eastward. The revolution of an arch, from north to south, occupies a space of time, varying from twenty minutes to two hours. At Cumberland-House, the arches were in many instances almost stationary for several hours; a proof, that if their motion was not slower, their distance from the earth was greater than at Fort Enterprise.

The arches which are faint at the horizon, very frequently pass the zenith without any increase of brilliancy or apparent internal motion. I conceive them to be more elevated than any other description of Auroræ.

The second general class of Auroræ are those which propagate themselves from different points of the compass, between north and west, towards the opposite points; sometimes also originating in the S. E. quarter, and extending themselves towards the N. W. They may be subdivided, like the former, into the distant arches, which pass to the southward without much visible change in their appearance; and those which discover beams, and separate at intervals into wreaths, flashes, and irregular segments, exhibiting all the phenomena described above. In explaining the mode by which the two general classes of Auroræ are conducted into the horizon, I shall call the motion of the arches (which is in a plane seldom deviating more than two points from the magnetic meridian) the direct motion; and that by which the Auroræ propagate themselves nearly at right angles to the magnetic meridian, the lateral motion. Let us suppose a mass of Aurora to be modelled at its birth, in a longitudinal form, crossing the meridians at various angles; the whole to be impelled with a direct motion towards the magnetic south, but the parts having different velocities, and each extremity continually removing itself, by a lateral motion, from the centre, so as to increase the length of the mass. If the centre enter the northern horizon, it will appear like an arch, the real extremities being invisible; and its direct motion will carry it to the southward in that form. But if one extremity first enter the horizon, it will extend itself, by its lateral motion, to the opposite point, passing, at the same time, by its direct motion to the southward.

Of the unequal velocities of the parts, we had many instances, in the direct motion of the arches, by which the centres were often carried from the zenith 60° or 70° to the southward, while the extremities did not materially alter their positions. Nor can this be accounted for by any application of the rules of perspective, because arches exactly similar sometimes changed the bearings of their extremities in proportion to the advance of their centres; and at Cumberland-House, on two occasions, the extremities of arches arrived at the east and west points of the compass, while their centres remained only 10° above the northern horizon.

There are two other forms of the Aurora which cannot be classed in either of these descriptions, and the occurrence of which is not frequent.

The first is a small mass, much elevated above the horizon, sometimes exhibiting brilliant beams, and then disappearing or passing to the southward.

It has, perhaps, been detached by violent motion from a body below the horizon. The second is an arch from north to south. In it the lateral and direct motions are in the same direction. The flashes and beams are, in my opinion, generally inclined in the direction of the dipping needle. Their perspective must be considered in determining this; for, near the magnetic meridian, they appear perpendicular to the horizon; but when at some distance to the eastward or westward, they decline towards the perpendicular at different angles.

The coronæ, and other wreaths of the Aurora, sometimes approached so near, that the beams appeared under an angle of 10° or 12°. No difference was then distinguishable between them and the flashes before described, except that the time of their existence was shorter.

The colours, shown by the beams when in rapid motion, were pea-green at the upper extremities, and purple and violet intermixed at the lower. (It will be remembered that these were the three colours which Mr. Morgan produced by introducing an electric spark into an exhausted glass bulb.) On one occasion, the lower colour was orange, which last was, in every instance, the prevailing colour at Cumberland-House.

On the 8th of March, 1821, at 5h. 30m. p. m., immediately after sunset, an arched Aurora was visible, extending from N.W. to S.E.b.S. This was the earliest period of the day at which we saw it; for although it might from the shortness of the days in December and January, have been seen at 3 p.m., if present, it seldom appeared before 7 p.m., and was usually most brilliant at midnight. On the 11th of February, the clouds formed a regular arch extending N.N.W. to E.; and the needle of a compass, fixed in the house, for the purpose of making observations, receded 20° from the magnetic meridian to the westward. I saw these clouds disperse, and afterwards collect in a different form. The disturbance of the compass, is another proof of the presence of the Aurora during the day; but, on the whole, there is reason to conclude that such is not often the case. On the 13th of November the Aurora was seen, between the clouds and the earth, by Mr. Franklin and Dr. Richardson. On the 13th of March, I saw an Aurora, which was emanating in wreaths from the N.W., pass over the lower surface of a stratum of white clouds. The upper edge of the clouds was 80 feet distant from the lower, and its Azimuth, S.35° W. The Aurora passed at the altitude of 70° and

therefore could not have been more than two miles from the earth, supposing that the elevation of the clouds was $2\frac{1}{2}$ miles. The wind was W., and the temperature of the air 36°. Another circumstance, which twice came under my observation, is too remarkable to be omitted. The Aurora was very brilliant near the zenith, the sky perfectly clear, and the wind moderate, when a discharge took place of small flakes of snow, which continued during several minutes. In both instances, showers of snow had fallen about half an hour before; but at the precise periods of these phenomena, no clouds were visible 10° above the horizon. To account for them on any known principles, we must wholly abandon Euler's theory of the zodaical light, and Dr. Halley's circulation of magnetic effluvia.

On the 27th of April, at 10h. 30m. p.m., a single column of Aurora rose in the north, and traversed the zenith towards the south; another column appearing, N.E. b. E., and taking a parallel direction. The frost was slightly agitated, and the beams momentarily visible. It passed to the western horizon in ten minutes, and was followed by the other, which became brighter as it approached the zenith. I am now convinced they were borne away by the wind, because the columns preserved exactly their distance from each other during their evolution; and some detached wreaths, projected from them, retained the same relative situations of all their parts; which never happens when the Aurora is carried through the air by its own direct motion. The wind was E. b. N., a strong gale, and the temperature of the air 9°.

It must be admitted that the influence of the wind upon the Aurora, was never suspected until the 27th of April. However there are several particulars connected with the subject, which may have prevented such an influence from manifesting itself on former occasions. 1st. When the coruscations were rapid and brilliant, they forced themselves against the wind, or in the contrary direction, without any perceptible difference of speed; from which circumstance, I was led to suppose that they were not in any degree affected by the wind, and did not afterwards pay sufficient attention to discover my error. 2nd. The prevalent winds were from the eastward and westward; and the arches usually extending from N.W. to S.E.; the influence of the wind might have been mistaken for their lateral motion. 3d. The northerly winds, acting from the same quarter as the direct motion, were confounded with it. Lastly, the southerly winds, which were not common, always filled the

atmosphere with clouds, so that the Aurora was not visible. Perhaps, after all, the Aurora of the 27th of April was nearer to the earth than any other which we saw.

On the 11th of March, at 10h. p. m., a body of Aurora rose N.N.W., and after a mass of it had passed to E. b. S., the remainder broke away, in portions consisting each of several beams, which crossed about 40° of the sky with great rapidity. We repeatedly heard a hissing noise, like that of a musket-bullet passing through the air, and which seemed to proceed from the Aurora; but Mr. Wentzel assured us that this noise was occasioned by severe cold, succeeding mild weather, and acting upon the surface of the snow, previously melted in the sun's rays. The temperature of the air was then — 35°, and on the two preceding days, it had been above zero. The next morning, it was — 42°, and we frequently heard a similar noise. Mr. Hearne's description of the noise of the Aurora agrees exactly with Mr. Wentzel's, and with that of every other person who has heard it. It would be an absurd degree of scepticism to doubt the fact any longer; for our observations have rather increased than diminished the probability of it.

We were informed by the natives, that the Aurora indicated, by peculiar appearances, the state of the atmosphere which was to follow on the ensuing day. For instance, when it is bright, and the motion rapid, it will be succeeded by a strong wind; but when attenuated and expanded over the sky, by mild and cloudy weather. A careful examination of the meteorological journal does not furnish sufficient foundation for these conclusions. But, although the influence of the Aurora upon the weather has been deemed insignificant, it is by no means improbable that the latter considerably affects the former. To suppose that a luminous body, floating in the air, and sometimes situated near the clouds, is within the bounds of the ordinary atmospherical changes, and may announce those changes by assuming a form which must be in some measure determined by the circumambient pressure, is not, I should think, inconsistent with any philosophical principles. If we had not, unfortunately, lost the only instrument calculated for the purpose, we might at least have ascertained what relation the weight of the air bears to this interesting meteor.

In the month of January, one of Kater's azimuth compasses was fixed on a shelf within the house, near a parchment window, which admitted the air

through several holes. Another small compass belonging to the transit instrument, to the needle of which no card was attached, was placed in a recess at the opposite side of the house, in the open air. The variation of the latter was inspected by Mr. Franklin, and of the former, by me, at several hours of the day and night. Both were very frequently affected by the Aurora, but in different degrees; and they recovered their former positions at different times. Upon some occasions they were affected in the day, and upon others, one compass alone was affected. Mr. Franklin remarked, that a certain position of the Aurora was always attended by a variation of his compass in the same direction, and that the motions of the needle were so immediate, as to be often visible during his observation. Mine, on the contrary, however various the shape and situation of the Aurora, in the course of two or three hours, declined gradually to the eastward or westward, without ever retrograding; and I could not perceive that the increase or decrease of the variation depended upon any particular position of the Aurora, for it never was stationary for one-fourth of the above-mentioned period. However, all the remarkable aberrations of both instruments took place during the same nights, and were found to be at their maximums on the following mornings, and they generally recovered before 8h. p. m. As these maximums were the last result of the impulses given by the Aurora, and their duration the longest, they were compared together, and about half of them found to be in contrary directions from the magnetic meridian, but not equal in quantity. Considering the Aurora as magnetic effluvia, the aberrations of both needles should have been always in the same direction with respect to the magnetic meridian; because all bodies which are not ferruginous, are equally conductors of magnetism, and will transmit it in the same straight line—whereas, electricity conveys itself through the channels which are the best conductors, and may act from different quarters upon two needles differently situated: and its effect continues, till the charge received by the needle is carried off by the pivot supporting it, which, by experiment with an excited electric, appears to require not less than 10 or 12 hours.

The common cork-ball electrometer not having on any occasion given signs of a charge, I tried the following experiment, in order to attain further evidence on the subject. A brass needle was attached to a compass card, and balanced on a copper pivot in a wooden box. It was about four inches in radius, and a

copper arch of 60° to that radius, was fixed at one end of the box, which was closed by a wooden slide, and paper pasted over every crevice to exclude the air To give it the same advantages for conducting electricity as the compass boxes, (which are made of brass,) I introduced an iron wire, eight inches in length, perpendicularly through the lid, in such a manner, that its lower extremity was in a horizontal plane with the needle; and a pane of glass at that end of the lid, enabled me to see into the interior of the box. Having previously ascertained that it contained no magnetism, the instrument was placed, on the 2d of May, on a covered shelf, at the outside of the house, in a position nearly east and west; the brass needle being 25′ from the conductor, and a small glass bubble adjusted on the box, in order to prevent its otherwise unperceived movement. At 12h. p. m., I examined the needle, and found its position unaltered. No Aurora was then visible, but one was afterwards seen by Mr. Franklin; and at 8h. a. m., May 3d, the needle and conductor were in contact. I moved the needle 40′ from the conductor, and it was similarly affected at some period on the nights of May 3d, 5th, 6th, 9th, 10th, and 11th. The thermometer, during this period, ranged in the day between + 26° and + 56°; and in the night, between + 10° and + 33°. I did not see the Aurora, except on the nights specified above; and did not perceive any alteration in the needle till the succeeding mornings.

The night of the 12th furnished a more satisfactory proof of the agency of the Aurora. At 10h. p. m., the needle was not affected, and no Aurora was visible. At 0h. 30′ a. m., May the 13th, several arches appeared across the sky from N.W. to S.E., and the needle was attracted to the conductor from the distance of 1°. The temperature of the air was + 12 . I now determined to convert the instrument into a kind of electrometer, by insulating the needle and conductor. The pivot which supported the former was fixed upon sealing wax, and the part of the latter which passed through the lid was covered with the same substance.

Paper was pasted on the box as before, and it was re-placed at 2h. p. m. on the 14th, the temperature of the air being 54°. A heavy gale of wind from N.N.W. with snow, immediately followed, and the temperature of the air, at midnight, was reduced to 19°. At 9h. a. m. May 15th, the needle was removed 30° from the conductor, and both were still charged, so that I could not bring them together till the conductor was accidentally touched. I believe this

charge to have been received from an Aurora; because the same weather, preceding and following it, did not affect the needle in the day, when the increased warmth of the air was more favourable to the production of electricity in other quarters, and also to its passage. On the 24th of May, between 10h. and 12h. p. m. the needle was attracted to the conductor, and repelled 25°*. The next morning, Mr. Franklin found the needle of the transit instrument (which was then in the meridian) affected 20′. The brightness of the twilight prevented us from seeing the Aurora, and I therefore discontinued my observations.

That electricity was the cause of the motions which I have described does not admit of a doubt. But whether the electricity was received from, or summoned into action by, the Aurora, my readers will determine for themselves, being in possession of the facts upon which I have myself founded my opinion.

APPEARANCES OF THE AURORA AT FORT ENTERPRISE.

Extracted from the Journal of Lieutenant Hood, R.N.

1821, January 10th, at 8h. p. m. an arched Aurora N.N.W. to N.N.E. At 11h. p. m. a double arch, much broken, but not bright, from N.W. to S.E.

11th. At midnight, faint Aurora from west to east.

14th. At midnight, five arches of Aurora from N.W. to S.E.: a large corona borealis.

15th. At midnight, an arched Aurora from N.W. to S.E.; beams very bright; colours, violet below, pea-green above. Their motion did not appear to be general in any direction, but proceeding from particular points towards the S.E. and N.W. at the same time: weather clear.

21st. At midnight, a double arch; extremities N.W. to S.E., centre S.W. 12° high. At 1h. a. m., a large body issued from N.W. and covered the sky with wreaths and flashes: colour as usual.

22d. At 9h. p. m., faint arch from N. b. W. to E.

23d. At 9h. p. m., a double arch, N.W. to S.E., centre S.W. 60° high.

* The thermometer was then 20°, and at 3h. p. m. it had been 58.°

January 24th. At 9h. p. m., a bright double arch from W. to S.S.E.: rapid motion of beams.

25th. At 9h. p. m., five parallel arches, the centre one from N.W. to S.E. The northernmost arch was the brightest, the rest faint.

27th. At 8h. p. m., faint arch from N.W. to E.S.E., centre N.N.E.

28th. At 9h. p. m., faint arch from NN.W. to E.b.S.; at 11h. it advanced to the zenith, and the beams were distinguishable; extremities N.W. and S.E.

30th. At 2h. a. m., an arch N.W. to S.E. composed of many wreaths of beams; bright, with rapid motion; colour as usual. At midnight, Aurora similar to that of last night: general motion of wreathes S.E.

February 1st, at 2h. a. m., an Aurora similar to that of last night. At midnight, an Aurora similar to that of last night.

3d. At 1h. a. m., an arch N.W. and S.E., which passed S.W., and was followed by another at 2h. a. m.: at midnight, Aurora much broken and scattered over the sky.

5th. At midnight, several wreaths of beams, some of them Coronæ Borealis, occupying a large space from N.W. to S.E.

6th. At 11h. p. m., a faint arch N.W. to S.E.

7th. At midnight, Aurora similar to that of last night.

8th. At midnight, a bright arch N.W. and S.E., centre S.W. 65° high; rapid motion of beams: at 2h. a. m., it passed to S.W.

9th. At 11h. p. m., Aurora across the zenith, N.W. and S.E.; at 2h. a. m., it passed to the southward.

10th. At 7h. p. m., appearance of Aurora N.W.

11th. At 3h. p. m., an arch of clouds exactly resembling the Aurora, from W.N.W. to E.S.E., they were, however, driven away by the wind.

12th. At 11h. p. m., two arches N.W. to S.E. passing quickly S.W.

14th. At midnight, arched Aurora, W.N.W. and E.S.E.: some exceedingly bright flashes, which, as usual, appeared and disappeared without changing their positions.

15th. At 10h. p. m., faint arch, W.N.W. and E.S.E.

19th. At 9h. p. m., an arched Aurora, N.N.W. and E.S.E. at 1h. a. m., some segments of arches in the zenith and to the southward; slight interior motion: colour ordinary.

20th. At 10h. p. m., similar Aurora to that of last night.

21st. At 9h. p. m., four arches, from W.N.W. to E.S.E.; their extremities close together; beams distinguishable of the ordinary colour. At 2h. a. m., one bright waving arch in the zenith, and several flashes in the S.W. quarter.

22d. At 9h. p. m., three arches from N.W. to S.E., much attenuated.

23d. At 8h. p. m., five bright arches, from W.N.W. to E.S.E., across the zenith; at 9h. p. m.; their centres bore S.W. 20° high; extremities still W.N.W. and E.S.E.: some interior motion visible.

24th. At 10h. p. m., two arches from N.W. to S.E., centre N.E.—at 11h. p. m., they were in the zenith.

26th. At midnight, three indistinct and broken arches from N.W. b. N., to S.E. across the zenith.

27th. At 9h. p. m., four arches from W.N.W. to S.E.: some interior motion. At midnight, they joined in one arch 50° broad, extending from E. to W., much attenuated.

28th. At midnight, many wreaths of Aurora from W. to E., forming coronæ in the zenith, the beams of which were unusually large; faint colours, violet at the lower extremities, and pea-green at the upper.

March 1st. At midnight, a broken and faint arch, centre S.W., which had previously crossed the zenith.

2d. At 10h. p. m., two arches, N.W. and E.S.E.: some interior motion, but no beams.

3rd. At midnight, an arch faintly visible, E. and W.

4th. At midnight, two coronæ, S.W. b. W. 70° high, and several flashes; no other Aurora visible.

6th. At 1h. 30′ a. m., an Aurora N.W., like the stem of a tree, shooting out several branches S.E., which exhibited wreaths of beams. They passed so rapidly to the S.W., that two of them disappeared in that quarter in ten minutes. Many flashes visible at intervals; colours, violet below, and pea-green above, very brilliant.

8th. Just after sunset, with a strong twilight, plainly saw an arched Aurora from N.W. to S.E. b. S. centre S.W. 70° high. At 9h. p. m., three arches N.W. and S.S.E. centre S.W. b. W. 10° high. A wreath in the zenith. At 1h. a. m., Aurora spread over the sky, moving towards the S.E.

9th. At midnight, three arches passed to the southward. Some quick flashes; faint colours, violet and green, situated as before.

10th. At 9h. p. m., an arch seen through the clouds.

11th. At 10h. p. m., a bright arch W.N.W. and E.B.S., emanating from a large body of Aurora in the N.W. quarter. The arch separated into portions of several beams each, which broke away and passed to the S.E. in succession, with great rapidity.

March 12th. At 10h. p. m., a double arch shaped like a sling, with the bend N.W. and the ends S.E.; faint.

13th. At 9h. p. m., an arch across the zenith; extremities N.W. and S.E.b.S., centre S.W. A wreath from N.W. towards E.S.E., but broken at the height of 70° S.W.b.S., was seen distinctly to pass between a stratum of white clouds and the earth. The upper border of these clouds was 80° high.

15th. At 11h. p. m., a faint irregular arch, N.N.W. and E.S.E., centre in the zenith.

17th. At midnight, an arched Aurora N.W. and S.E.; faint.

18th. At 11h. p. m., an Aurora similar to that of the 17th.

19th. At 11h. p. m., a broken arch from N.b.W. to S.W.b.W., 10° high.

20th. At 9h. p. m., three faint arches N.W. and S.E. extremities close together, centres S.W.

21st. At midnight, many wreaths from N.W. to S.E., bright, but no colours; general motion from S.E. to N.W.

22nd. Two arches passed to the southward, before 10h. p. m., when another appeared, much broken, from N.W.b.N. to E.S.E.

23rd. At 10h. p. m., cloudy; three arches from N.W.b.N. to S.E.b.S. beyond clouds.

24th. At 10h. p. m., two arches N.W. and S.E., faint; slight motion.

25th. At midnight, three arches similar to those of last night.

26th At midnight, an arch N.W.b.W. and S.E.b.S.; very faint at each extremity; beams distinguishable in the middle.

27th. At 9h. p. m., arch seen faintly N.N.E. and S.S.W.

28th. At 8h. p. m., an arch passed the zenith gradually to the southward.

31st. At 11h. p. m., an attenuated Aurora spread over the sky. At midnight, three faint arches W.N.W. and S.E.

April 1st. At midnight, two large wreaths from N.W. to S.E., forming an Aurora shaped like an S; motion rapid.

5th. At 11h. p. m., brilliant Aurora, of many half-formed wreaths; colour, ordinary. At 2h. a. m., an arch W.N.W. and E.S.E., centre S.S.W.; rapid interior motion.

7th. At 2h. a. m., a mass of Aurora, with many flashes in S.E., whither it had passed from N.W. in the course of the night. At 11h. p. m., Aurora much spread; bright and rapid. At 2h. a. m., three arches to the southward, and one N.E. b. N. advancing.

April 11th, at 1h. a. m., very detached Aurora N.W. and S.E.; faint, but some interior motion visible.

13th. At 11h. p. m., several segments of arches N.W. and E.S.E.; little motion.

15th. At 2h. a. m., numerous dispersed flashes in the south.

16th. At 9h. p. m., two faint arches N.W. b. N. and E. b. S.

18th. At 1h. a. m., a beautiful Aurora emanating in a large wreath from W. b. N., and doubling in the E.S.E. quarter; the beams large, and their motion exceedingly quick; colours, violet below, and pea-green above. It passed to the southward, and was followed by another. At midnight, scattered and faint Aurora.

19th. At midnight, four arches from west to S.S.E.; extremities close together; beams bright, and in rapid motion.

20th. At midnight, an arch from W.N.W. to E.S.E.; irregular, faint, and little motion.

21st. At midnight, appearance of Aurora through a haze.

22nd. At midnight, two wreaths in the zenith; rapid interior motion. A mass of Aurora, S.W., which had passed the zenith.

23rd. At 11h. 30′ p. m., an arch from N.W. to S.E.; quick motion of beams, faint violet below; several flashes. It passed so fast to the southward, that at midnight the sky was perfectly clear.

27th. At 10h. 30′ p. m., saw an Aurora rising north, in a single column towards the south; another N.E. b. E., taking the same direction. The first was slightly agitated, and the beams momentarily visible. Both passed to the

westward in ten minutes ; the second column brightening as it approached. I am satisfied that they were carried away by the wind, from the following circumstances: that the columns preserved exactly their distance from each other during this evolution, and several wreaths which they formed, retained the same relative situations of all their parts, which is never the case when the Aurora by its own motion passes from north to south. At midnight, an attenuated Aurora stretched from east to west, which, being nearly parallel to the direction of the wind, no effect like the former was distinguishable.

29th. At 9h. p. m., appearance of Aurora through the clouds.

30th. At 9h. p. m., bright twilight ; an arch visible from N.W. to S.E. b.E. At 11h. p. m., a similar arch, composed of several detached wreaths. It had a general motion to the westward, which I attribute to the wind, for the reasons detailed above.

May 2nd. At midnight, an arch formed of several detached masses, which fluttered violently, with a serpentine motion from E.S.E. towards W.N.W. They were extremely bright and fringed with violet, as usual below, and green above. The coruscations were so transitory, that the beams were scarcely distinguishable. Though the general motion was to the westward, the whole mass faded before it reached the horizon, and disappeared in five minutes.

3rd. 12h. 30′, strong twilight, apparently an arch of Aurora, from N.E. to S.W.

5th. At midnight, arched Aurora, W.N.W. and S.E.b.E.

6th. At midnight, appearance of Aurora in zenith.

10th. At midnight, arched Aurora, N.W. to S.E.

11th. At midnight, several streams of Aurora, from W.N.W. to E.S.E., and flashes to the southward.

12th. At midnight, several flashes and wreaths, S.E.

13th. At midnight, Aurora beyond the clouds.

TABLE III. Extracted from the Journal of Lieut. Hood, R. N.

January 1821.

Days	10 A.M.	1 P.M.	5 P.M.	9 P.M.	12 P.M.
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	36 0	....	35 53	35 56	35 58
11	36 1	35 46	.. 48	.. 55	.. 58
12	36 0	....	.. 53	.. 56	.. 58
13	36 0	.. 44	.. 52	.. 56	.. 58
14	36 3	.. 44	.. 50	.. 56	36 36
15	36 41	36 31	36 6	.. 56	35 38
16	35 58	35 53	35 54	.. 58	36 0
17	36 2	.. 46	.. 52	.. 54	35 38
18	.. 20	.. 18	.. 38	.. 46	36 3
19	36 01	.. 43	.. 51	.. 55	35 58
20	.. 3	36 3	.. 53	.. 56	.. 59
21	....	35 48	.. 58	.. 53	.. 58
22	36 46	36 33	.. 42	.. 50	.. 52
23	34 58	35 32	.. 36	.. 34	.. 30
24	37 32	34 58	.. 30	.. 32	36 10
25	35 46	35 30	.. 28	.. 38	35 39
26	.. 50	.. 35	.. 31	.. 35	.. 30
27	.. 38	.. 36	.. 30	.. 30	36 16
28	....	.. 30	....	.. 29	....
29	.. 40	.. 22	.. 29	.. 31	35 31
30	.. 38	... 32	.. 30	.. 32	.. 30
31	.. 45	.. 29	.. 37	.. 23	.. 29

February.

Days					
1	35 50	35 50	35 58	....	35 54
2	.. 48	.. 38	.. 40	35 44	.. 38
3	.. 48	.. 35	.. 34	.. 34	.. 28
4	.. 30	.. 34	.. 36	.. 38	.. 40
5	.. 50	.. 40	.. 30	.. 38	.. 35
6	.. 38	....	.. 44	.. 30	.. 6
7	.. 6	26	.. 38	.. 38	.. 32
8	.. 32	34	.. 38	.. 32	.. 30
9	.. 48	....	.. 38	.. 38	.. 42
10	.. 44	.. 44	.. 55	.. 45	.. 45
11	.. 45	.. 55	.. 35	.. 40	.. 43
12	36 8	.. 45	.. 30	.. 33	.. 38
13	35 38	....	.. 35	.. 38	.. 45
14	36 2	.. 47	.. 42	.. 40	.. 36
15	35 54	.. 47	.. 40	.. 33	.. 40
16	.. 53	.. 38	.. 38	.. 44	.. 47
17	.. 54	.. 47	.. 44	....	.. 24
18	36 20	36 17			
19	35 48	35 56	36 0	36 8	36 11
20	36 15	36 24	.. 16	35 44	35 44
21	36 28	36 15	35 38	.. 42	.. 42
22	35 48	35 40	.. 38	....	.. 38
23	.. 55	.. 55	.. 52	.. 48	.. 54
24	.. 50	.. 45	.. 44	33	.. 38
25	.. 57	.. 57	.. 46	44	.. 40
26	.. 52	.. 45	.. 45	....	.. 44
27	.. 55	.. 48	.. 45	.. 50	.. 44
28	.. 55	.. 50	.. 54		.. 48

March.

Days	9 AM.	1 P.M.	5 P.M.	9 P.M.	12 P.M.
1	35 55	35 45	35 48	.....	35 48
2	36 05	36 7	36 0	35 55	.. 58
3	37 54	35 54	35 52	....	.. 54
4	.. 58	.. 58	.. 52	....	.. 48
5	37 18	36 25	36 5	35 50	.. 51
6	35 50	35 46	35 44	....	.. 44
7	.. 34	.. 30	.. 28	.. 28	.. 26
8	.. 55	.. 45	.. 43	.. 38	.. 43
9	....	.. 52	.. 50	.. 50	34 56
10	.. 10	....	.. 42	.. 40	
11	.. 50	.. 55	....	.. 48	
12	36 8	35 40	.. 28	.. 16	35 16
13	35 45	.. 54	.. 45	.. 46	36 27
14	36 20	....	.. 28	.. 32	35 32
15	36 3	.. 34	.. 32	.. 30	.. 52
16	35 34	....	.. 27	.. 28	
17					
18					
19					
20					
21					
22	35 58	35 25	34 42	35 0	35 10
23	.. 36	.. 6	35 8	....	35 14
24	35 43	.. 14	35 0	.. 08	.. 15
25	35 33	.. 0	34 46	35 0	35 0
26	35 48	.. 36	.. 46	.. 46	.. 55
27	35 50	.. 36	.. 44	.. 40	.. 44
28	35 44	.. 38	.. 31	.. 30	.. 32
29	.. 35	.. 30	....	.. 32	.. 34
30	.. 38	.. 34	.. 30	....	.. 20
31	35 53	.. 45	....	.. 45	.. 49

April.

Days					
1	35 20	....	34 40	....	34 31
2	.. 35	35 38	35 29	....	35 20
3	.. 30	.. 33	.. 17	35 13	35 13
4	.. 22	.. 29	.. 31	22	.. 19
5	.. 28	.. 40	.. 20	2	34 55
6	.. 27	.. 12	.. 14	....	35 34
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					

The variation assumed in the above Table, was that observed at 4h. p.m. in Aug. 20, 1820, namely, 35° 48′.

The above diurnal variations were obtained by one of Kater's Compasses, which may be read within a minute by the reflecting microscope. It was placed on a shelf in a room of the Expedition-house, at Fort Enterprise, and close to a parchment window, which admitted the air, by several holes. No ferruginous matter was near enough to affect it; but it was twice accidentally moved; and although the extent of the error thereby occasioned, was ascertained by comparison with Mr. Franklin's observations, and those of the preceding days, yet their connexion is not to be fully depended on, so as to derive from them the monthly variations. However, the intermediate periods will serve to show the variation for particular days, and also the amount of aberration caused by the Aurora.

A diurnal variation evidently exists; the maximum of which is at 9h. a. m. and the minimum, at 3 or 4h. p. m. The irregularities of the needle may be attributed to the Aurora; because the appearance of that meteor has been so much more frequent here than at Cumberland-House, where the needle was not often disturbed.

Some other opinions were inserted in this part of Mr. Hood's journal; but as they are detailed more at length in his preceding remarks on the Aurora Borealis at Fort Enterprise, they are omitted here.

REMARKS ON THE AURORA BOREALIS,

EXTRACTED FROM

Dr. RICHARDSON'S JOURNAL.

The account of the Aurora Borealis, in the following pages, is an exact transcript of notes taken at the moment of the appearance of the different phenomena.

To place a connected view of the appearances before the reader, the whole of the observations in the month of December, 1820, have been given, to which a few remarkable nights in the other months have been added.

The altitudes and dimensions of the different masses of light were ascertained merely by the eye, and therefore have no pretensions to accuracy, and it is only the *apparent* shapes that are described, the effect of perspective not being taken into account. The bearings given of the Aurora are also to be taken with some latitude, but they are more likely to be generally correct than the altitudes, as they were ascertained by the different angles of our buildings; or, in some cases, when the masses of light were near the horizon, by their relations to distant trees, and peaks of hills, whose bearings from the spot of observation were known. To reduce the bearings given to magnetic bearings, the easterly mean variation of the compass at Fort Enterprise, amounting to 36° 20′ is to be applied. The dip of the needle there was 86° 59′. To shew the condition of the atmosphere with regard to the transmission of sound, and its capacity for moisture, the state of a rapid about a quarter of a mile from the house, which continued open all the winter, has been occasionally mentioned.

The forms of the Aurora are described in such language as occurred at the time, without any regard whatever to theory; but it may be proper to remark, that in reference to Mr. Dalton's opinions, detailed in Rees's Cyclopædia, which comprised the whole of my limited reading upon the subject up to the time of observation. I have been more particular in noting the directions of the small slender beams of light, of which the masses were sometimes composed, than I should otherwise have thought necessary. It will be seen that

the following observations do not accord with the positions he lays down; that, contrary to his statement, the beams would not always meet in a point if prolonged upwards; that they do not always converge to the place in the heavens to which the south pole of the dipping needle points; and that the rainbow-like arches do not invariably cross the magnetic meridian at right angles. But, independent of all theory, I think the following notes will at least serve to prove that the Aurora is occasionally seated in a region of the air, below a species of cloud which is known to possess no great altitude. I allude to that modification of cirro-stratus, which, descending low in the atmosphere, produces a hazy continuity of cloud over-head, or a fog bank in the horizon. Indeed, I am inclined to infer that the Aurora Borealis is constantly accompanied by, or immediately precedes, the formation of one or other of the various forms of cirro-stratus. On the 13th of November, and 18th of December, its connexion with a cloud intermediate between cirrus and cirro-stratus is mentioned; but the most vivid coruscations of the Aurora were observed when there were only a few thin attenuated shoots of cirro-stratus floating in the air, or when that cloud was so rare that its existence was only known by the production of a halo round the moon. The bright moonlight of December was peculiarly favourable for observations of this kind. Had the nights been dark, many of the attenuated streaks of cloud hereafter mentioned would have been totally invisible. The natives of this country pretend to foretel wind by the rapidity of the motions of the Aurora; and say, that when it spreads over the sky in an uniform sheet of light, it is followed by fine weather, and that the changes thus indicated are more or less speedy, according to the appearance of the meteor, early or late in the evening. Our observations were not continued long enough to confirm or contradict these notions; but it may be perhaps worthy of notice that certain kinds of cirro-stratus are also regarded by meteorologists as sure indications of wind and rain. In reference to Mr. Dalton's opinion that the arches of the Aurora always cross the magnetic meridian at right angles, it may be observed, that there is very often an apparent convergence of the parts of the Aurora towards the magnetic east or west, or to some point in their neighbourhood; but the light in its passage across the sky, even when it traversed the zenith, very seldom appeared to the eye to describe the segment of a circle, but was either elliptical, or formed various irregular curves and flexures.

I think I have on some occasions discerned a polarity in the masses of cloud belonging to a certain kind of cirro-stratus, which approaches to cirrus, by which their long diameters, having all the same direction, were made to cross the magnetic meridian nearly at right angles. The apparent convergence of such masses of cloud towards opposite points of the horizon, which has been frequently noticed by meteorologists, is of course an optical deception, produced when they lie in a plane parallel to that on which the observer stands. These circumstances are here noticed, because if it should be hereafter proved that the Aurora depends upon the existence of certain clouds, its apparent polarity may, perhaps with more propriety, be ascribed to the clouds themselves which emit the light; or, in other words, the clouds may assume their peculiar arrangement through the operation of one cause, (magnetism for instance,) while the emission of light may be produced by another, a change in their internal constitution perhaps, connected with a motion of the electrical fluid. These crude opinions are offered with diffidence, and my knowledge on these subjects is so limited, that I attach no importance to them; but it appears to me that they would be strengthened, were the attempts now making to excite magnetism by the electrical or galvanic fluid, to prove successful. Generally speaking, the Aurora appeared in small detached masses for some time before it assumed that convergency towards opposite parts of the horizon, which produced the arched form. An observation that I would connect with the previous remarks, by saying that it was necessary for the electric fluid (or the Aurora, if they are the same) to operate for some time before the polarity, of the thin clouds in which it has its seat, is produced. This part of the subject, however, is more intimately connected with the interesting observations made on the variation of the magnetic needle by Captain Franklin and Mr. Hood. The object of my notes was merely to record the optical appearances of the meteor.

An electrometer, constructed upon Saussure's plan, placed in an elevated situation out of doors, exhibited no signs of a charge from the atmosphere at any time during the winter. The electricity of our bodies, however, at times was so great, that the pith balls instantly separated to their full extent upon approaching the hand to the instrument, and our skins were in the middle of winter so dry, that rubbing the hands together considerably increased their electricity, and at the same time produced a smell similar to that which is often perceived

when the cushion of an electrifying machine rubs hard against the cylinder. The same thing was observed more sensibly in some stuffed quadrupeds that hung in our apartments. Their furred skins, whether rubbed or not, often accumulated such a charge of the electrical fluid, that when the knuckles were presented to them, they gave a smart shock which was felt as far as the elbow.

The Aurora did not often appear immediately after sun-set. It seemed that the absence of that luminary, for some hours, was in general required for the production of a state of atmosphere favourable to the generation of the Aurora. On one occasion only (March 8th) did I observe it distinctly, previous to the disappearance of day-light.

By the way of more perfectly describing one form of the Aurora, rather than with the view of drawing any inference, I shall state that the slender beams of light which compose the Aurora when its motions are rapid, are exactly similar to what would be produced by a quick succession of electric sparks, elicited from a charged cylinder, by a body studded with a row of points, moved rapidly to and fro before it.—Or, supposing a long range of cloud were to commence at one end, to impart, from successive points of its surface, its charge to a similar parallel mass, a current of light would be produced, apparently consisting of parallel beams, lying at right angles to its line of direction, as described on the night of the 29-30th December, at 2h. a.m. Were the clouds supposed to lie in different planes, and to be bounded by curved edges, every variety of form which that species of Aurora assumes might be produced. The colour of the light of the Aurora is not always noted in the following pages, but when faint it was generally steel-gray, or that of the galaxy. When the low hazy modification of cirro-stratus appeared in the sky, the light, for the most part, was a gold-yellow colour, more or less deep; and when the sky was clear, or when only a few fine threads or thin shoots of cloud were visible, the colours were vivid and prismatic.

I have never heard any sound that could be unequivocally considered as originating in the Aurora; but the uniform testimony of the natives, both Crees, Copper Indians, and Esquimaux, and of all the older residents in the country, induce me to believe that its motions are sometimes audible. These instances are, however, rare, as will appear when I state that I have now had an

opportunity of observing that meteor for upwards of two hundred different nights.

November 13th, in the evening the sky was covered by a stratum of fleecy clouds, their forms generally orbicular and texture rare. They were separated from each other by intervals of clear-blue sky of various extent, but in some points came in contact. The Aurora was observed to move along these clouds, strongly illuminating their faces next to the earth, and very seldom passing across the blue sky, but spreading from cloud to cloud by their points of contact, sometimes slowly, more often with considerable rapidity. The light was generally brightest in the centre of the cloud, and it often originated simultaneously in various parts of the heavens, more or less distant from each other. At some moments the whole sky was illuminated. No distinct beams were seen, and the light had uniformly a grayish colour, with a light tinge of yellow. Thermometer at noon $+10°$, in the evening $+8°$.

Nov. 24th. A bright moonlight evening, cloudless sky, with a light breeze from the W.N.W. An arch-formed Aurora, extending from S.E. to N.W. This arch was composed of several disunited portions of arches, every succeeding one having a higher commencement and termination than that which preceded it, reckoning from the horizon to the zenith. Their altitude near the centre of the imperfect arch which they formed by their arrangement was from 40° to 60°. One of these portions presented a smooth edge inferiorly, or towards the south, but its northern border was fringed with long falcate pointed rays, whose bases appeared to twist together to form the southern edge. It had a striking resemblance to a shoot of the moss called *dicranum scoparium majus*.

Nov. 26th. Ther. at noon, $-13°$, in the evening, $-25°$. Sky cloudless, and of a pretty deep blue. An Aurora appeared in the early part of the night, having a general direction from N.W. to E.S.E. It consisted of several concentric but irregular arches, all of which, without changing their position, occasionally assumed the falcate form observed on the 24th. The uppermost arch nearly reached the zenith. The smaller stars became invisible when the brighter parts of the Aurora passed over them. Although the air appeared perfectly clear during the time the Aurora was visible, yet there was a fall of a very small snow. Its particles were so minute as to be

scarcely visible to the naked eye, and were most readily detected by their melting upon the skin. The same phenomenon, of an almost imperceptible snow falling from a clear sky, had been before observed in a bright sun, which rendered visible a great number of icy spiculæ floating in the air.

1820, December 1st. During the day, the sky kept tolerably clear, a slight appearance only of the stratus being visible near the horizon; but a snow, whose particles were so minute as to be discerned only in the sunshine, fell at intervals during the forenoon. At noon, the snow was more apparent, and a bow was produced in the neighbourhood of the sun's place in the heavens. At 8h. p.m. Wind E.N.E., light, with a very clear sky.

The Aurora commenced by a beam shooting up from the northern horizon; afterwards masses of light appeared in various parts of the sky, particularly in the eastern quarter; and at length an arch was formed from S.E. to N.W. The centre of the arch, when it was first formed, lay to the northward of the zenith, but afterwards passed gradually to the southward. When about 60° above the southern horizon, it assumed the falcate appearance, described on the 24th November, the pointed tails directed towards the north. The falci-form processes sometimes separated laterally, so as to appear like parallel beams crossing the line of direction of the arch obliquely. Their altitude was not altered at the moment of their separation. At times the general arch was dispersed, and a number of small arches formed, whose ends occasionally rolled inwards upon themselves in form of a scroll. The whole body of the light ultimately descended below the southern horizon and disappeared; not a cloud was visible during the evening.

December 2nd. Wind in the morning, N.E., inclining to snow. Ther. −14° at 9h. p.m., −6°, wind N.N.W. Hazy weather, no stars visible. A faint arch of the Aurora from N.W. to S.S.E.

December 3d, 1820.

Hour.	Temp.	Wind.		
A.M. 9	−0	N.N.W.	Fresh	Hazy weather.
Noon	+6	do.	do.	Small snow.
P.M. 4	+5	do.	do.	Cloudy. No mist rising from the rapid.
9	+4	do.	do.	do.

Snow during the night. No Aurora observed.

December 4th, 1820.

Hour.	Temp.	Wind.			
A. M. 9	−11	N N.W.	Fresh	clear sky.	
Noon	−10	do.	do.	do.	
P. M. 2h. 30m.	−14	do.	do.	do.	A thick cloud of mist hanging over the rapid.
4	−18	Wind very variable from south by the westward to N.E. moderate clear.			
9	−25	do.		Clear.	

The Aurora forming a broad arch of bright light, its centre about 45° south of the zenith, and its extremities bearing S.E. and N.W., respectively. It passed gradually to the southward and disappeared.

December 5th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	−26°	N.E.	Light breezes	and clear weather.
Noon	−20	do.	do.	
P. M. 4	−22	do.	do.	A thick mist rising from the rapid all day.
9	−26	do.	do.	

The Aurora to-night had its light disposed in large masses, having indefinite shapes, situated in various parts of the sky, but most crowded in the southern quarter. There were several layers of dark clouds near the horizon. The Aurora was visible in various spots where no stars were to be seen, but several of the larger stars were visible through a bright arch, which at one time crossed the zenith, having a direction from north to south.

December 6th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	−15	W.	Moderate.	Hazy with a light fall of snow.
Noon	+2	W.N.W.	do.	do.
4	−6	N.W.	Fresh.	do. No mist from the rapid..
9	−14	W.	Light.	Clear.

Aurora, in an arch form, passing from S.E. to N.W. over the zenith, broad towards its middle, but narrow and spirally twisted near the horizon. Stars appeared through it without any perceptible diminution of their brilliancy.

December 7th, 1820.

Hour.	Temp.	Wind.	
A. M. 9	−24	W.	Moderate and clear, stratus near the horizon.
Noon	−14	do.	do.
P.M.2h.30m.	−20	N.b.S.	do. Mist from the rapid, before the sun rose and after it set.
9	−26	W.b.N.	do. Clear.

At 10h. p.m. the Aurora formed an arch, broader towards its middle, and emitting a denser light from its southern edge, but becoming fainter by imperceptible degrees towards its northern edge, until it disappeared altogether. Its upper or northern edge lay near the zenith. As its limbs approached the horizon, they became more slender, and assumed a twisted appearance. The stars appeared very dimly through the more dense parts of the Aurora.

December 8th, 1820.

Hour.	Temp.	Wind.			
A. M. 9	−29	W.S.W.	Moderate,	clear.	Dense mist hanging over the rapid.
Noon	−27	N.N.W.	do.	do.	Mist scarcely visible.
P. M. $2\frac{1}{2}$	−27	N.	do.	do.	Mist re-appearing.
9	−30	N.N.E.	do.	do.	No Aurora visible at nine.
Midnt.		N.	Fresh	do.	Rapid, very noisy.

At 11h. p. m. sky very clear, and the stars brilliant. A well-formed arch of light crossed the zenith, extending from N.W. to S.E. It moved slowly to the southward, broke up into several irregular masses of light, and disappeared. At midnight, there was no appearance of Aurora.

December 9th, 1820.

Hour.	Temp.	Wind.			
A. M. 9	−34	N.b.E.	Moderate,	clear.	Temperature of the rapid 32°— of the water in the river, ascertained by the same thermometer, through a hole in the ice, 31. 3°.
Noon	−30	do.	do.	do.	
4		do.	do.	do.	
9	−36	W.	Light.	very do.	

The Aurora made its first appearance at 9 o'clock p. m., near the horizon in the N.W.b.N., and shot over to the S.W., forming several concentric arches, the uppermost of which passed a little to the southward of the zenith. As

the limbs of these arches approached the horizon, they seemed to be twisted together, and terminated on each side in a single, suddenly acuminated point, about 7° or 8° high. These extremities emitted a more dense light than the middle parts of the arches, which were rare, and permitted the stars to be seen clearly through them.

At 9½h., p. m., the moon arose, and the Aurora now formed broken irregular masses near the southern horizon.

At 10½h., a depressed arch of the Aurora was formed, its extremities terminating in the opposite points of the horizon, or in the N.W. and S.E., and its centre scarcely rising 10° above the southern horizon. It was more brilliant than the former arch, and completely hid the stars.

Half an hour after midnight, there were several large masses of light in the eastern and N.E. quarters of the sky. The arch had disappeared, but a luminous point remained in the N.W., the quarter from whence it originally sprung.

About 1h., (a. m., 10th) several portions of light were arranged, so as to form an interrupted arch from the E. to the N.W. The masses of light, before noticed in the east and N.E., had now united, and spread along the horizon to the S.E.

December 10th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	−38	W.	Light clear.	Very dense and copious mist from the rapid.
10½	−40	W.S.W.	do.	do.
Noon	−37		Calm	do.
2½			do.	do. A heavy cloud of mist over the rapid.
6½	−42	W.	Light	do.
9	−43	W.	do.	Rather hazy.

At half past 6 p. m., an arch of the Aurora appeared, having an elevation of 30°, and a direction from W.N.W. to S.S.E. It was irregularly elevated and depressed in various parts; and its breadth, which was in general about 6°, occasionally expanded so as to occupy thrice that space. These dilatations were effected with a slow motion, and were partial, seldom including more than 10° or 15° of the arch at a time. The centre of the dilating part was more brightly illuminated than the other parts of the arch. The return of the

arch to its former dimensions was equally gradual with its dilatation. The arch was occasionally divided into five parallel beams, which, having a direction nearly from north to south, traversed it obliquely. These beams had a quick lateral motion, and were sometimes gathered into masses that receded so far from each other, as to break the arch into several portions, which had pointed extremities arising from the obliquity of the beams which composed them. The length of the beams was sometimes considerably increased by their northern extremities shooting up, whilst their lower ends remained stationary. These appearances were but of momentary duration, the beams rapidly re-uniting to form a homogeneous arch.

After the Aurora had continued for about half an hour to display a succession of the above forms, the arch totally disappeared, and a horizontal mass of light was observed in the southern quarter of the sky, having its face longitudinally barred by several thin strata of clouds.

At 10½h., there were various irregular masses of light scattered over the sky, but most luminous in the north. The Aurora had appeared early in the night in the west, afterwards its most luminous parts were collected in the south: about nine, it shone most brightly in the eastern quarter of the sky, and now, as we have just mentioned, its principal seat was in the north.

December 11th, 1820.

Hour.	Temp.	Wind.			
A. M. 9	−33	N.E.	Fresh.	hazy.	small snow.
Noon	−25	do.	do.	do.	do. Very little mist at the rapid.
P. M. 9	−31	N.N.E.	Moderate.	clear.	Bright moonlight.
Midnt.	−31	do.	do.	do.	Rapid very loud.

At 5h. p. m., several broad arches of rare light appeared, extending from N.W. to S.E. At six, they disappeared, no change of the weather having occurred in the interim, the sky remaining clear, with a bright moon. At nine, an arch was formed in the east, broad, irregular, and rather faint. Its extremities bore north and S.E., and were spirally twisted near the horizon.

At 10½h., there was an arch in the southern quarter of the sky, 40° high. Its extremities had an equal breadth with its centre, and bore N.W. and S.E. respectively. Wind a little more northerly—sky clear.

At 11h., two bright arches passed near the zenith in a direction from N.W.

to S.E.; one complete, extending from horizon to horizon; the other reaching only half way across the sky, the west end being deficient. The edges of both arches were well defined, their apparent acuteness throwing the clear blue sky far back. The arches were broadest near the zenith; and when most bright, appeared to consist of several streams of light, nearly but not exactly parallel to each other, and having the same direction with the arch.

These streams receded from each other by a lateral motion, leaving interstices, sometimes of a fainter light, sometimes of clear blue sky; and they were at times gathered together toward one side of the arch, which then shone with a very dense light. The S.E. extremities of the two arches were united near the horizon, and bending to an angle, ran horizontally to the northward for a considerable distance.

After the arches had continued for some time, they moved slowly to the southward, became rarer and broader, were blended into each other, and finally broke into several irregular masses of light. During the evening, many of the meteors termed falling stars were observed. The rapid was very loud.

December 12th, 1820.

Hour.	Temp.	Wind.			
A.M. 9	−34	N.N.E.	Light.	Clear.	
10	−35	W.b.N.	do.	do.	Dense mist over the rapid.
Noon,	−34	do.	do.	do.	Bright sun. Do.
P.M. 9	−40	S.W.	do.	do.	
Midnight			Moderately clear.		

At 9h. p.m., there was a broad, faint, irregular arch of light, whose extremities bore N.N.W. and S.E.b.S.

At 11h., weather rather hazy. A bur or halo closely encircling the moon. A low arch of light from E. to S.E., and a broad horizontal mass in the north.

At midnight, there were two faint but distinct arches, whose extremities originating and terminating in consort, bore N.N.E. and S.E. The upper arch had of course a greater curvature. It nearly reached the zenith; the other was about 70° high. At the same time, many faint and irregular masses of light existed in other parts of the sky. After the circles had remained stationary for a short time, they broke in the middle. The S.E. ends disap-

peared; whilst the remainder, separating laterally into several long streaks of light, shot quickly up in flashes from the N.W. to S.E., crossing the zenith. Sky moderately clear.

About 1h. (a. m. 13th,) there were many masses of light in various parts of the sky, which bore a strong resemblance to assemblages of the clouds denominated cirro-cumuli. At one time a remarkable body of light appeared in the N.N.E., which occasionally split into detached parts by a lateral recession, but its general motion was directly to the S.W. It obscured the smaller stars, but did not completely hide those of the first magnitude.

December 13th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	—35	S.W.	Light. Clear.	Pretty dense mist from the rapid.
Noon,	—32	W.b.S.	Moderate clear.	
9	—34	Nearly calm.	Small snow.	Bright moon-light. A few stars visible.

At 1h. (a. m. 14th), a broad arch of faint light, crossing the zenith, extended from horizon to horizon, its extremities bearing E. and W. A meteor, termed a falling star, was observed at this time. It remained luminous, until it came below the near side of a tree-top at no great distance. When the arch broke up, its west end disappeared entirely, but its eastern extremities assumed for some time the semblance of a group of cirro-cumuli.

December 14th, 1820.

Hour.	Temp.	Wind.		
A.M. 9	—26	S.b.W.	Light cloudy.	
11	—19	S.S.W.	Moderate do.	Prevailing cloud a modification of stratus or cirro-stratus.
Noon,	—19	do.	do.	do. Little mist from the rapid.
P.M. 1			Snow.	
8	—16	N.E.	Mod. Clear.	

At midnight, a faint arch extended from the horizon in the S.E. b.E. to the N.W.b.W., its centre passing to the southward of the zenith. Bright moon-light.

December 15th, 1820.

Hour.	Temp.	Wind.		
9	−32	N.b.E.	Light.	Clear. Much mist from the rapid.
Noon,	−28	E.N.E.	do.	Clouds of low cirro-stratus. Bright sun-shine illuminating multitudes of small icy spiculæ floating in the air. A flight of small birds hovering near the house, (red caps).
9	−16	E.	Fresh.	Snow.
Midnight			Strong gales.	Small snow.

December 16th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	−6	S.E.	Moderate.	Snow falling in minute flakes.
Noon	−6	S.	do.	do. Sun seen obscurely.
9	−6	N.N.W.	do.	do.
Midnight.		do.	Fresh.	Hazy.

December 17th, 1820.

Hour.	Temp.	Wind.		
A. M 9	−8	N.N.W.	Strong gale.	Clouds of cirro-stratus; a few flakes of snow falling.
Noon	−21	do.	do.	Sun obscured.
P. M. 9	−30	N.N.E.	do.	Dark weather; much snow drift.
11	—	W.N.W.	do.	Cleared up. Bright moon-light, with dark blue sky.

At 1½h. (a. m. 18th) a number of detached irregular masses of light were so arranged as to form an arch 30° high, having a direction from N.W. to S.E. Weather clear, strong wind.

December 18th, 1820.

Hour	Temp.	Wind.			
A. M. 9	−33	N.N.W.	Fresh.	Clear.	Little mist rising from the rapid.
Noon	−31	do.	do.	do.	
9	−33	do.	Mod.	do.	Very bright moon-light. Stars clearly seen.
Midnight.	−37	Light winds, varying rapidly from S.W. to W.			

At 11½h. p. m., the sky, which had previously been clear, was covered by a thin stratum of clouds, belonging to that modification of cirrus which forms the mackarel sky of sailors, conjoined with small portions of what are termed by the same people mares'-tails. Between the bars of the former, and the long fringes of the latter, streaks of deep-blue sky appeared.

These clouds were not dense enough to hide the larger stars completely; and from their first appearance, until they spread entirely over the sky, not more than a quarter of an hour elapsed.

On attentively regarding the sky for some time, the more rounded parts of the mackerel sky were observed to send shoots across the blue spaces, to unite with similar processes of the neighbouring masses. At the moment of junction, a yellowish light, with a slight tinge of red, was emitted, most brightly from the centres of the two clouds, but extending, though more faintly, to their margins. A longer space of time had not elapsed, than was required to note down these appearances, when an arch of light was observed to cross the zenith, its extremities bearing east and west, and terminating about 50° from the horizon. It was from 3° to 4° broad, and had a pale gold-yellow colour. When it ceased to emit light, its site was seen to be occupied by a range of small fleecy clouds, similar to those already described, but more closely aggregated. The moon now bore nearly south, and shone brightly, strongly illuminating the arch-formed range of clouds just mentioned; but their rarity was such, that they showed no dark sides. Winds very variable from S.W. to W.

About a quarter of an hour after the last observation, a round mass of cloud in the S.E. was observed to assume, suddenly, an appearance of greater density, at the same time emitting from its centre a yellowish light. Immediately after which, it shot forth towards the S.E. several bright parallel horizontal streaks of light, which, crossing the near face of a neighbouring mass of clouds, became slightly curved from the south. They were about 8° or 10° above the horizon, and were prolonged after passing before the clouds, through a portion of clear sky. A few degrees beneath them, there were two or three dark layers of cirro-stratus.

The clouds, in their general arrangement at this period, had that appearance of convergency in opposite points of the horizon, which has been frequently noticed in a sky covered with cirri. In the present instance, these points were at right angles to the magnetic north and south. In the zenith, the mackerel

sky prevailed; but in the S.E. and N.W. (true), the clouds were more dense, and presented various depending fringes towards the points of the horizon already mentioned. The magnitudes of the masses, too, in different parts of the sky, diminished so regularly, as they receded from the zenith, as to convey an idea that their long sides were seen in the N.E. and S.W. quarters of the sky, but their ends only in N.W. and S.E. quarters.

At midnight, several of the cirriform clouds, which were in the neighbourhood of the moon's place, reflected her light strongly, and hence appeared to have a pretty dense structure; but, when they passed before the face of that luminary, they became nearly invisible, producing only a slight halo or bur, but not sensibly diminishing the light.

At 20m. after midnight, the northern quarter of the sky became perfectly clear to the height of 35°, the rest of the heavens being overspread by small fleecy clouds, separated by narrow intervals. The edge of cloud bordering on the clear sky was well defined, ran east and west, and was made up of the ends of small and rather broad parallel bars, having a direction from north to south: a very common modification of cirrus. The moon was at this time wading through a collection of small clouds, and was surrounded at the distance of 10° by a faint, though distinct, halo. In the S.W., in a clear part of the sky, there existed a small spot of yellowish white light, which for a few seconds gradually increased in brightness, and then sent forth suddenly a luminous beam, which crossing a portion of the deep blue sky, passed over the well marked edge of cloud above described, continued its course in front of the clouds, brightly illuminating their faces, and terminated to the southward of the zenith near the moon's place in the heavens. When this beam had attained its extreme length, it formed a half-arch concave to the westward. It was scarcely formed, however, before it divided into a number of small parts, which being segments of circles, and rising successively one above the other, formed a kind of tiled arch. It disappeared altogether in three or four minutes, leaving the clouds unaltered in appearance.

At 12h. 40′ the sky had become clear as far as the zenith. The edge of the clouds, which was now overhead, was still composed of parallel bars, directed to the north and south. Under these bars, a few streaks or threads of very rare cloud were seen floating, and, at times, emitting a faint orange-coloured light. The clouds in the southern part of the sky, although they

appeared pretty dense in the bright moonlight, were yet rare enough to allow the larger stars to appear through them.

By one o'clock, the whole mass of cloud had gathered together towards the south, and disappeared in the horizon; but at the same time a few long and very rare threads of cloud, which were at intervals faintly luminous, shot athwart from east to west in the deep blue of the northern part of the sky. On former occasions, the Aurora had been observed to illuminate the face of the clouds next the earth; but the present night was remarkably favourable for the observance of that phenomenon, the brightness of the moon-light, and the clearness of the sky, rendering the clouds very visible and well defined.

December 19th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	−42	W.	Moderate.	Clouds of cirro-stratus. Thick mist over the Rapid, which was rather silent.
Noon	−41	W.S.W.	do.	Cloudy, sun obscured.
P. M. 9	−38	N.b.S.	do.	do. Halo round the moon at the distance of 12°.
Midnt.	−38	W.	do.	Rather hazy, large stars only visible; Rapid inaudible.

At midnight the sky cleared up, a few cirro-strati were seen to the southward, and there was a slight bur round the moon; the rest of the sky was of a grayish blue colour. At this time a broad bank of the Aurora appeared in the north, lying horizontally, at an elevation of 25°. There were also a few long parallel streamers to the westward, flashing in the direction of their lengths, from W. b. N. to E. b. S. They disappeared suddenly, leaving in their site a faint yellowish light.

December 20th, 1820.

Hour.	Temp.	Wind.			
A. M. 9	−43	S.	Light.	Foggy.	
10	−44	do.	do.	do.	A very dense mist rising from the Rapid, and a fog hovering over the river and in the low valley. Rapid very loud in the evening.
Noon	−41	S.W.	do.	Clear. bright sun.	
P. M. 9	−46	E.N.E.	do.	Very clear.	
$10\frac{3}{4}$	−46.6	E.N.E.	Calm.	do.	
Midnt.	−45.6	E.N.E.	do.	Slight haze.	do.
A. M. 1	—	E.	Light.	Foggy.	Rapid continuing noisy.

At 10h. 45′, bright moonlight. The sky, which had previously been very clear, was suddenly overspread by a thin stratum of fleecy clouds. They were in general orbicular, but were much crowded, so as to leave small interstices of clear blue sky. A few stars were visible through the rarer parts. About 7° or 8° above the northern horizon, there existed a mass of cloud rather more dense, which began, soon after its formation, to emit a faint yellowish light. In two minutes the light became brighter, and spread towards the S.W., by a slow waving motion, like an increasing volume of smoke, rolling parallel to the horizon. It continued sweeping round the sky in this manner, until the produced end bore N.W., and then became irregularly elevated in the middle, assuming an arched form. At the instant at which this elevation took place, a stream of light issuing from the S.W. formed an arch about 2° higher than the other, and parallel to it. The second arch exhibited nearly the colours of the rainbow.

The red colour occupied its under edge, and it darted down towards the inferior arch a number of light-red fringe-like processes. The two arches were scarcely formed when they disappeared, but instantly appeared again, and continued to do so in rapid succession for a minute or two, the upper one retaining its prismatic tints, and the under one an uniform pale yellow colour. The motion of the light by which the arches were re-produced, was sometimes from right to left, sometimes in the opposite direction. The upper arch too was occasionally split into narrow parallel streams, which had not only a rapid lateral motion in the direction of the arch, but were also lengthened out, both upwards and downwards, by sudden flashes. At such moments the coloured tints were most vivid; the red always predominating.

About five minutes after the first appearance of the Aurora, a bright mass of light was observed bearing N.N.W.; from which a column, possessing prismatic tints, shot up as high as the zenith, a similar column at the same time springing to meet it, from the site of the two arches which had now disappeared. A brilliant arch was thus formed, whose extremities bore W.N.W. and S.S.E. In an instant thereafter, the whole sky was covered with small arcs, and irregular masses of light, mostly composed of short parallel beams. These masses moved rapidly from the horizon towards the zenith, and back again. The duration of this phenomenon was about seven or eight minutes, when the light wholly disappeared.

The colours of the arches, in their general appearance and arrangement, resembled those of the rainbow; but the blue-green, or violet, were not distinctly visible. The yellow ray occupied most space, and was the faintest whilst the orange was the brightest. The red was nearly as abundant as the yellow, and approached it in its hue to lake-red. The moon shone brightly all the time. After the disappearance of the Aurora, the sky remained as before, covered with a thin stratum of clouds, but their texture had become more rare, their edges worse defined, and their masses more blended into each other. In short, they answered the description of the cirro-stratus, in the first stage of its change from the cirrus. The moon had a bur or halo round it; and a candle, both in the open air and the house, was also surrounded by a halo.

At 11h. 30′, there was a faint mass of light in the S.S.W., about 20° high, occasionally fading away, and allowing a body of dark cloud to appear in its site. The light re-appeared first in the centre of the cloud, of a gold yellow colour, but became fainter as it spread outwards.

At midnight, the weather was rather hazy, and there was very little blue sky to be seen. A few minutes before 12, a portion of cloud in the S.E. was faintly illuminated; and at the same instant, a luminous spot made its appearance in a clear blue space in the north, about 15° high. From this spot an arch shot up which passing to the eastward of the zenith, joined the luminous cloud in the S.E. The arch was scarcely formed when it disappeared, but was as speedily formed again by a mass of light rising in the S.E., and rolling to the north like a volume of smoke from a chimney, increasing in dimensions as it rose. Immediately after the second formation of this arch, it assumed the appearance of a shoot of the moss, alluded to in the notes on Nov. 24th, and which is termed by botanists, *falcato-secund*. The points of the rays or streams were directed to the south. In a short time the arch separated into small curved segments, which vanished in their turn, and the attention was next directed to the formation of a long range of prismatic light, about 60° high, its extremes bearing west and north. This light had a pale gold-yellow colour, and was attenuated towards the north, its southern or upper edge being brightest. When this passed away, a number of irregular masses appeared in various parts of the sky. At 1h., (a. m.) 21st,) the sky was obscured by a fog.

December 21st, 1820.

Hour.	Temp.	Wind.		
A.M. 9	−32		Calm.	Clear. Minute particles of snow falling.
Noon	−28	W.S.W.	Light.	Sun obscured. Snow falling in small crystals.
P.M. 9	−36	N.	do.	Clear.
10h.20m.		W.	do.	do. Slight haze in the S.E. near the horizon.
11		N.	Light.	do.
Midnt.	−42	do.	do.	Clear.
1. 22d	−41		do.	Cloudless. Slight haze.

During the early part of the evening, there were a few thin horizontal clouds in the N.E., but the sky, in general, had a clear grayish-blue colour. Some streaks of cirrus were faintly visible in the east. The moon shone brightly, but was surrounded by a bur, as was also the candle. Rapid noisy.

At 10h. 20m. the Aurora rose in the S.S.E., and proceeding across the sky, divided into several broad arches, which terminated about 30° from the western horizon. The common stem in the S.S.E. appeared as if formed by the twisting of the ends of the different arches together, and had a waving irregular motion, sometimes apparently doubling upon itself; and once or twice it separated into small parallel portions, having a lateral motion in the direction of the arch, but with their ends pointing north and south. The arches were three, and at one time four, in number, and gradually diverged more and more from each other towards their western ends. The uppermost passed a little to the southward of the zenith, and they were each about 4° or 5° broad. The spaces between them were sometimes faintly illuminated. After they had continued stationary for about ten minutes, the S.S.E. common stem moved slowly round the horizon, until it bore south, leaving a streak of light behind it, whilst the truncated ends, or those which were directed towards the western horizon, approached each other, and were lengthened out to the horizon in the W.N.W. by the rolling motion of smoke. Contemporaneously with these motions, the centre of the arch moved up and down, so as to appear undulated, and even contorted; the moving parts frequently dilating considerably, and always becoming brighter in the centre, at the commencement of their motion. The light had a pale yellow hue, and, when brightest,

was not sufficiently dense to hide the larger stars. Its motions were in general slow, and unattended by flashes.

At 11h., a bright arch extended across the zenith, from E. b. S. to N.W. b. W. The S.W. quarter of the sky being at the time occupied by a homogeneous mass of light, which had a crescentic edge turned towards the east, and there was a similar mass in the north concave towards the south. The arch at first exhibited a vermicular motion from east to west, then split into parallel beams, possessing, as usual, a rapid lateral motion; and in a short time, the Aurora in every part of the sky began to move with such velocity, and to assume such a variety of forms, as to defy description. The central arch more than once exhibited two distinct currents, or motions of its parts, flowing from one end to the other in opposite directions at the same instant; and at one time all the detached parts of the Aurora appeared to collect together, to form a beautiful circle or corona, which surrounded the zenith at the distance of 45°, and in which the rapid lateral motion of the beams was very apparent, having a direction from north, round by the south, west and east. The beams, in this case, were apparently perpendicular to the earth's surface in every part of the luminous ring which they formed. In a half-arch, which rose immediately afterwards from the northern horizon to the zenith, the extremities of the beams were directed from east to west, and the ranges of beams which formed, in rapid succession, masses of light, of various shapes, in every part of the sky, had no certain direction. The general colour of the Aurora was a pale yellowish-gray; but when the beams moved with a rapidity that could scarcely be followed with the eye, they emitted a pale, but bright red light, slightly tinged with purple or violet. These beams sometimes lengthened and shortened themselves with extreme rapidity, and the prolonged extremities emitted a light equally brilliant, and of the same hue with the rest of the beam. In about 15m. the whole of these beautiful phenomena vanished, leaving behind only a few faint masses of light. The moon was still surrounded by a slight bur, and the wind had changed to the west.

At midnight, the southern quarter of the sky was occupied by a broad horizontal mass of light. At 1h. there was no appearance of the Aurora whatever. Sky cloudless, but rather hazy; minute crystals of snow falling. During the evening the wind was very variable, but light.

December 22nd, 1820.

Hour.	Temp.	Wind.		
A.M. 9	−45	W.	Light.	Clear. A few cirro-strati near the southern hor.
Noon	−43	do.	do.	do.
2h.30m.	−41	do.	Mod.	do.
P.M. 9	−43	do.	do.	do. A bur round the moon and candle.
Midnt.	−43	do.	Light.	
$2\frac{1}{2}$			Calm.	Hazy. Halo round the moon distant 20°.

At 4h. 30m. p.m., dark and rather cloudy. A faint mass of the Aurora in the E.S.E. about 20° high.

At 9h. p.m., the sky being of a pretty deep blue colour, except in the S.E., where there was a mass of white clouds near the horizon, the Aurora appeared in form of an arch of yellowish gray light, about 70° broad in the centre, where it reached from the zenith to within 29° of the southern horizon. Its limbs were spirally twisted and tapered, touching the horizon in the S.E. b. S. and N.W. b. W. The light of this arch was arranged in longitudinal bands, having different densities, and varying in length from 20° to 80°. These long portions of light occasionally receded laterally from each other, and then formed a series of arches or parts of arches; the upper ones including those beneath them. Whilst the arches were thus separated, some of them exhibited a waving lateral motion, the others remaining stationary, and some times one end of an arch moving more than the other, it was carried obliquely across the general line of direction of the parts of the large arch. The arches approached each other by an irregular, slow, lateral motion, occurring simultaneously in the different arcs, and again formed a continuous body of light, varying in density in different parts.

At 11h., a beam of light rose from the southern horizon to the height of 45°, where it terminated, that end then bearing N.W. b. N. It was about 10° broad, and gradually attenuated from its centre outwards.

At 11h. 30m., there was a long luminous bank in the south nearly of equal dimensions throughout. Its centre was slightly elevated, and about 40° high. Its extremities faded imperceptibly away in the S.S.E. and western parts of the sky. It was about 6° broad, and emitted a greenish-yellow light. The sky near its extremities was dark, and completely hid the stars. Five or six degrees below this nearly horizontal mass, a smaller but similar one appeared

for a short time. Neither continued above two or three minutes, and they exhibited no quick motions, but merely brightened a little, undergoing at the same time a slight dilatation. They appeared, however, and disappeared at intervals until $2\frac{1}{2}$h. (a.m. 23,) when a haziness overspread the sky.

December 23, 1820.

Hour.	Temp.	Wind.		
9	—36	W.N.W.	Moderate.	Hazy.
10	—37	do.	do.	do.
Noon	—36	do.	do.	Clearer, bright sun.
3	—40	W.	do.	Clear, thick mist over the rapid.
9	—41	do.	do.	Hazy in the horizon, clear in the zenith, rapid rather quiet.
Midnt.	—45	do.	do.	clear.

At 11 p. m., a faint arch of pale greenish light, about 10° broad, rose to the height of 30°, one of its limbs, bearing S.E. b. S., sprung from a collection of whitish clouds, (cirri,) situated about 10° above the horizon. The other, bearing W. b. N., faded away imperceptibly in a dark part of the sky, where there were neither clouds nor stars visible.

The moon was surrounded by a bur, and did not give much light. At 12, the arch was still visible, but several strata of pretty dense white clouds now occupied the southern part of the sky to the height of 20°, and the extremities of the arch, which were broader and fainter than before, bore S. b. E. and W.N.W. In the middle of the arch there were several gentle elevations and depressions; but although the light occasionally brightened up in some spots, there were no quick motions amongst its parts.

The state of the atmosphere continued, as before, pretty clear in the zenith, but the bur round the moon, of a faint gray colour, with a slight tinge of orange on its outer edge, remained. A similar bur was formed round a candle, its diameter enlarging rapidly as the observer receded from it.

December 24th, 1820.

	Hour.	Temp.	Wind.		
A.M.	9	—43	N.W.	Light.	Clear. Bur round the moon. Thin mist from the rapid.
Noon.		—37	S.W. b. S.	do.	Hazy. Sun seen obscurely. Rapid very great.
P.M.	9	—40	W.	Moderate zenith.	Clear, horizon hazy.
Midnt.		—39.8	do.	do.	do.

December 25th, 1820.

	Hour.	Temp.	Wind.			
A.M.	9	−43	W.	Moderate.	Clear.	Faint bur round the moon, considerable mist over the rapid.
Noon.		−38	do.	do.	Cloudless.	Haze in the horizon.
	3	−35	S.W.	Fresh.	do.	do. Stratus in the south, rapid inaudible, and free from mist.
	9	−31	W.S.W.	do.	do.	A little haze.
Midnt.		−28				Cloudy and dark in the horizon. Stars seen obscurely in the zenith.

At 1 (a. m. 26th.), the Aurora appeared for the first time this night in form of a faint arch, extending from the altitude of 40° in the N.W. to a spot near the zenith, bearing S.E. It was composed of longitudinal bands or streams of light, connected with each other by a faint luminousness. A little snow was falling at this time in minute crystals, and there was a slight haziness in the sky.

December 26th, 1820.

	Hour.	Temp.	Wind.			
	9	−24	W. b. S.	Fresh.	Cloudy.	Much snow-drift, very cold.
Noon		−22	S.W.	Moderate.	do.	Stratus, sun obscured, much mist from the rapid.
	9	−29	W.	do.	Clear.	
Midnt.		−32	do.	Light.	do.	

At 10h. 30′ an arch-formed Aurora, about 8° broad, appeared a little to the southward of the zenith. Its extremities descended to within 15° degrees of the horizon, and terminated in the S.E. and N.W. At one time, the light of the arch appeared of uniform density throughout; at other times it was most intense along its southern or lower edge, and became gradually fainter upwards until it disappeared.

The stars were seen obscurely through the denser light; in other parts of the sky they shone brightly. At the same time, there appeared in the E.S.E. parallel to the horizon, a mass of bright light with two or three dark horizontal streaks across its face, produced apparently by intervening layers of cloud. The arch continued for a considerable time without undergoing any material alteration in its appearance, except that it occasionally brightened up and faded away again. Once, indeed, for a few moments, it separated into por-

tions parallel to each other, but having about 11° of obliquity with respect to the arch. These portions emitted a bright light, and were separated by faintly luminous spaces.

At 11h., the arch, having nearly the same direction as before, was composed throughout the greater part of its length by two parallel portions, each gradually fading away towards their edges; and the S.E. end of the arch was also lengthened out, and bent towards the east, so as to come in contact with the mass of light noticed above as bearing E.S.E. This bent portion of the arch was composed of several bars nearly of equal length, and arranged so that every succeeding one lay to the north of that which preceded it in their approach to the horizon: the whole were connected together by a faint diffused light; and from the same body of light in which that end of the arch now terminated, a column of faint beams rose perpendicularly to the height of 15°.

At 11h. 20′ the arch had increased its breadth to 20°, its northern edge being very near the zenith. Its extremities, bearing S.E. and N.W., were composed of irregular, and somewhat detached roundish, masses, but its centre consisted of five bright longitudinal bands connected by a faint diffused light. The mass of light formerly bearing E.S.E., had now moved round towards the south, and still resting in the horizon, formed the S.E. end of the arch.

At midnight, a great number of detached masses of light occupied the sky from 20° south to 10° north of the zenith. These masses of light varied in shape, but the greater number had somewhat of an oblong form. They were separated in some places by clear blue sky, in others they were connected by a diffused light. They lay in various directions in the zenith, but towards the horizon they had an appearance of convergency to the N.W. and S.E., and thus formed in the aggregate an arch 30° high in the middle, and tapering towards its extremities.

At 1h. 30m. (27th) the centre part of the above-mentioned arch or aggregated masses of light, had dilated so as to occupy the whole sky, except a clear blue space of 20 degrees from the northern horizon. The shapes of its component parts had undergone a material alteration, and were now so arranged and blended together as to bear a striking semblance to an immense double curtain with its ends gathered together in the N.W.b.W. and S.E. at about 10 degrees above the horizon; the space beneath being of a clear blue. From the

zenith, to carry on the similitude, the folds of the curtain proceeded in several beautiful festoons towards the north and south, and had occasionally a slow motion, as if it were folding and unfolding again and again. The moon at this time shone with a bright light and illuminated several layers of cloud (cirro-stratus) in the N.E., every other part of the sky being unclouded.

At 2h. a. m., a large homogeneous sheet of rare light was spread over 20 degrees on each side of the zenith, and near the horizon there were many layers of cirro-stratus, some of them pretty dense, so as to obscure the moon when they passed over its face. The rapid was quite inaudible at this time.

December 27th, 1820.

Hour.	Temp.	Wind.	
9	—42	Calm,	Slight fog, rapid very loud.
10	—43	do.	do.
Noon	—40	N.E. Light.	Zenith cloudless—light grayish blue—stratus creeping along the valleys—fine day.
9	—45	N.E. Light.	Clear.
11			do. Rapid, very loud.
Midnt.	—45		

At 11h. p. m., the sky clear, the moon not yet risen, but many stars visible. A beam of light, about 8° broad, rose from 10° above the horizon in the S.E.b.S., and gradually becoming fainter upwards, disappeared a little south of the zenith. After continuing stationary for some time, it sent forth a beam of light from its south-east end, which extended 11° more to the northward, whilst its fainter end was at the same instant prolonged, so as to form a complete arch, terminating in the N.W. b. W. horizon. A little haze was visible at this time in the southern horizon.

At midnight the Aurora formed a somewhat interrupted circle round the sky, about 15° high, which sent down from its N.W. b. W. and S.E. points, several pointed processes which nearly touched the horizon. Some large flexuose streaks, and masses of light traversing the zenith, connected the northern with the southern part of the circle; and there were also a few detached irregular

masses of light in other parts of the sky. The best defined part of the circle was in the N.E. quarter, and here a quick lateral motion to and fro was produced, as if by its separation into perpendicular bars. It was about 8° broad at this place. During the continuance of this phenomenon, many beams of light rose perpendicularly from the upper margin of the circle, but before they reached the zenith, their extremities were bent from their course so as to make various curves side-ways, or even to appear as if rolled up upon themselves.

When the Aurora had exhibited itself in this form for a considerable space of time, the whole mass of light suddenly appeared in motion, and sweeping round on each side, was gathered together to the southward of the zenith. Immediately thereafter a large portion of it was seen in the S.E., assuming an exact resemblance to a curtain suspended in a circular form in the air, and hanging perpendicularly to the earth's surface. The lower edge of this curtain was very luminous, and had a waving motion; and the illusion was farther heightened by the momentary appearance of perpendicular dark lines or breaks in the light, in rapid succession round the circle, exactly as the waving of a curtain would cause the dark shades of its folds to move along it. This beautiful curtain of light was about 40° high, of a pale-yellowish colour, and sent forth on the one side a process which approached the S.E. b. E. point of the horizon, and on the other was connected with a long regular arch, terminating in the N.W. horizon, similarly constructed, and having the same waving motion with the curtain itself. All this time the sky was perfectly clear except in the southern quarter, which to the height of 4° or 5° was occupied by dark clouds, apparently intermediate between stratus and cirro-stratus.

Half an hour after its first appearance, this curtain-formed Aurora was resolved into a number of detached irregular portions, which sometimes increased rapidly in every direction until they met with other masses, either before existing or appearing at the instant, and formed an uniform sheet of light which covered the whole sky. The formation of this great sheet of light was so rapid, that the eye could only trace its progress partially, and its dissolution and reappearance were equally sudden.

At 2h. p. m., the moon arose. A clear sky. The Aurora fainter and farther to the southward than before.

December 28th, 1820.

	Hour.	Temp.	Wind.			
A. M.	9	—48	Calm.	Very clear.	Thick mist over the rapid, and stratus or mist in the low grounds.	
	10	—48.4	S.W.	Light.		
	11	—47	W. b. N.	do.	Clear.	
Noon.		—47	W.	do.	do.	Thermometer on the surface of the river under the ice 32°. At the depth of two fathoms 42°.
P. M.	2	—47		Calm.	do.	
	6	—50.5	N.N.W.	Light.	do.	
	9	—51		Calm.	do.	
10h. 30m.		—49	N.	Light.	do.	Hazy in the horizon.
Midnight		—49	do.	do.	do.	
29th, a.m.	1		N.N.E.	do.	do.	Fog bank in the south. Rapid pretty loud.

At 6h. p. m., the Aurora, in an arched form, extended from the S.E. horizon to the N.W., across the zenith. This arch was at one time composed of a bright homogeneous stream of light about 8° broad; at other times, it split into parallel beams, their ends directed to the east and west. These beams receded from each other laterally, until they were separated by a space of clear blue sky, more than twice their breadths, speedily re-uniting again, however, to form the uninterrupted arch. A fainter arch appeared to the northward of the other, springing from, and terminating at, the same points in the horizon, but having an apparent curvature so much greater as to keep their centres 5° or 6° apart.

At 8h. The low fog to the southward had increased, and minute crystals of snow were falling, but the zenith remained clear.

At this time there existed a zone of light in the north, about 20° high, whose extremities, uniting with those of a similar zone in the south, dipped suddenly down to the horizon in the S.E. and N.W. points.

At 9h. In a calm and clear atmosphere, there were five arches, each about 4° broad; one crossed the zenith, another was elevated about 60° above the northern horizon; and there were three in the southern half of the sky, at elevations of 45°, 6°, and 80°. Their light was faint, and their extremities converged, so as to terminate conjointly in the N.W. b. N. and S.E. b. S. points.

At 10h. 30′. Columns of faint light rose perpendicularly from the horizon in the N., S.E., and S.W. points, to the height of 20°.

At midnight there was an arch of light in the south about 15° high, having its lower edge throughout its whole length, resting upon a fog bank; and there were also two or three faint beams rising from the horizon in the S.E., across a portion of clear sky; and a beam lying midway between the zenith and horizon, about 20° long, and pointing north and south.

At 1h. The sky in the zenith was clear, and was occupied by an arch tending from N.W. to S.E.

December 29th, 1820.

Hour.	Temp.	Wind.			
A. M. 9	—52	West.	Light.	Clear.	Low stratus in the valleys.
10	—53	do.	do.	do.	do.
Noon.	—52	North.	do.	do.	do.
2	—51	N.W.	do.	do.	do.
6	—57		Calm.	do.	
9	—53	East	Light.	do.	
Midnight.	52.8	do.	do.	do.	
2	—52	do.	do.	Very clear.	

At 6h. p. m., there appeared an arch of yellowish-grey and pretty dense light, about 10° broad and 25° high, which in a few minutes began to increase in breadth, and at length separated into two parallel arches, whilst at the same time a fainter beam sprung from its northern end, taking a direction towards the S. b. E., but becoming more diffuse; as it rose it disappeared in the zenith. The brighter part of the light obscured the stars. The united limbs of the two arches in the N. b. W., were divided by perpendicular dark spaces, so as to appear to be composed of oblique bars.

About 10m. after these appearances were noted down, the sky was occupied for about 70° to the northward of the zenith by large masses of light, arranged so as to converge towards the N.W. b. N. and S.E. b. S. points of the horizon. Near these points long slender processes of light descended, and united so as to form a common stem on each side, similar to the limbs of an arch of the common dimensions of 2° or 3° in breadth. The internal movements of the

Aurora at this time were sluggish, but large masses of light were frequently generated almost instantaneously.

At 7h. 30′, a number of arches sprung from the horizon in the N.W. b. N., and sweeping across the sky in various directions suddenly curved in, to terminate in the S.E. b. S. The arches were in general about 6° broad, and their middles were distant enough from each other to spread on each side of the zenith to the distance of 50°.

From 9h. to midnight, the Aurora formed many arches of light, very various in breadth and density, all having a common origin and termination in the N.W. and S.E., but crossing the heavens in a variety of directions, so as to occupy about three-fourths of the space on each side of the zenith.

The middle portions of some of these arches ran horizontally across the sky, whilst their extremities, making sudden curves, arrived at the common origin and termination of all the arches, which were seated for the greater part of the night about 4° above each horizon. At one time the light was arranged in a series of curves, including each other, and having their convexities turned towards the north on both sides of the zenith. In short, their arrangement was continually varying, but the breadth of the arches at all times was greater in the zenith. Large and diffuse columns of light sometimes shot up at right angles from the convex side of the arches, and portions of broken arches were occasionally seen in various parts of the sky, lying obliquely across the general line of direction. The changes of form were not produced by a quick flashing motion, but by the different parts of a new arch appearing simultaneously but faintly, then gradually brightening up in a manner that could be traced only by keeping the eye steadfastly fixed on a clear part of the sky, and watching the evolution of the light there.

At midnight a clear blue sky surrounded the zenith to the distance of about 20°, the rest of the sky had a light-grayish appearance, resembling the light of the milky-way, many stars shining brightly at the time. In some spots this diffuse light brightened up for a moment or two, assuming at the same time a yellowish hue.

At 12h. 30′, there was an arch in the south about 15° high, and various irregular masses of light in the north, the rest of the sky being of a deep blue.

At 2h. the sky very clear. At this time the Aurora was very brilliant, and

its motions so rapid that it was impossible to record them in the order of their occurrence with any thing like accuracy.

At one period the S.W. part of the sky was occupied by a mass of dense light, which was connected with a similar mass in the east by a current of light about 4° broad, moving with extreme velocity from W. to E. This stream of light bore a stronger resemblance to a cascade of water, than to any thing else I can liken it to; and it in general flowed from the one mass of light to the other, but sometimes its eastern extremity curled back in various directions, forming as it were beautiful eddies. The dark lines or spaces, whose instantaneous appearance and disappearance evinced the motion of the light, lay perpendicular to its line of direction, or pointing to the north and south.

For an instant, when the motions were most rapid, the light became very vivid, and assumed a reddish hue. At this moment, a loud crash was heard, similar to what is produced by a large piece of ice floating down a river, and crushing against a stone.

This noise was not repeated, and as it appeared to come from the river, would not have been noticed unless for its cotemporaneous occurrence with the brightening of the Aurora. The air at this time was rather favourable for the transmission of sound, the rapid being distinctly heard.

December 30th, 1820.

Hour.	Temp.	Wind.		
A. M. 9	— 53	N.W.	Light.	Clear. Much mist over the rapid. Low fog in the valleys.
Noon,	— 52	do.	do.	Low fog increasing.
3	— 50	Nearly calm.		Hazy in the horizon. Rapid moderately loud.
9	— 48	W.	Moderate.	Clear, but a bur round the candle.
Midnight,	— 47.5	W.S.W.	do.	do.

At 5h. p.m., an arch-formed Aurora extended completely across the sky from the N.W.b.N. to the S.E.b.E. From the N.W. end of this arch a pencil of light rose perpendicularly, and terminated at the zenith. Its hue and brightness were equal to that of the milky way, which was distinctly visible at the time. At 8h. p.m., two columns of light rose perpendicularly from the horizon in the N.W. and S.E. to the height of 10°. Their summits being connected by

a nearly horizontal beam of light, a depressed arch was formed to the northward of the zenith, from various parts of which pencils of light shot up directly towards the south, and rising 40° or 50°. Portions of two smaller and concentric arches were occasionally seen under the other.

At 9h. the Aurora continued to exhibit modifications of the appearances above-described.

At midnight, an irregular mass of light, having a spirally twisted form, rose in the horizon in the N. W. b. N. to the height of 60° apparently perpendicularly. Then turning to the northward, it continued its course horizontally across the sky; and, lastly, bent suddenly and obliquely to terminate in the S. E. horizon.

December 31st, 1820.

Hour.	Temp.	Wind.			
A. M. 9h. 0m.	−40		Calm.	Clear.	Rapid pretty loud. No mist from it.
11h. 0m.	−40	S. E. b. S.	Light.	do.	
Noon,	−36	N. W.	do.	do.	A few cirro-strati. Thin mist from the rapid.
12h. 30m.	−35	S. S. W.	do.	do.	
2h. 30m.	−36	N. N. W.	do.	do.	No mist from the rapid, which was pretty quiet. Bur round the candle.
6h. 35m.			Calm.	do.	
9h. 0m.	−40	N.	Light.	do.	
Midnight,	−42	W.	do.	do.	

At 6h. 35m. p. m., an arch-formed Aurora, 15° high, extremities bearing N. b. W. and E. b. S, From its north end several rays rose to the height of 10° or 12°, having a direction to the south.

At 9h. a zone of light, rising from the horizon, in the N. E., swept round the sky to the eastward and southward, with a gradual ascent, until it bore S. W., and had an elevation of 35°; from thence it gradually descended and finally terminated in the N. W. b. N. point of the horizon. Near the eastern horizon, this zone was continuous, but towards the south it was composed of thin and parallel layers.

At midnight, the Aurora covered the sky in fleecy masses, having the same

apparent convergence to the N.W. and S.E. points that has been described on former occasions.

Febuary 13th, 1821. At midnight, several layers of cirro-stratus in the northern half of the sky, with clear blue intervals. A zone of light existed in the north, its extremities bearing N.W. and E.N.E. It was composed of parallel beams pointing to the southward, and having a quick lateral motion. The eastern extremity of the zone was the most brilliant, and it sometimes rolled back upon itself, producing various curtain-like appearances, during which motions it passed in front of the neighbouring clouds, and completely hid them. The southern half of the sky was overspread with thin white clouds, through which a few stars appeared. When these clouds passed over the face of the moon, they produced a bur immediately around it, and a halo at the distance of 15°. The northern edge of the halo was occasionally illuminated with the yellowish red light of the Aurora, which gradually faded away into the white moon-light reflected from the cloud. The zone in a short time broke up, and its parts approached the zenith, often in their course whirling into a circular form, with an extremely rapid motion. At those times the beams of light appeared to be perpendicular to the horizon, and emitted various prismatic rays, of which yellow and pale violet were the most conspicuous. Sometimes the violet merely tipped the beams, at other times it appeared throughout their whole length. When these beams were arrayed in the circular form, so as to form a ring, their length varied from 2° to 4°. The light appeared this evening to the eye to be near the earth, a thin white haze evidently floating behind or above it, in some places near the moon's situation in the sky. The needle, by Mr. Franklin's observations, diverged very much to-night.

A very short time after these observations were made, the whole sky was overspread by a tolerably dense, uniform, hazy, white cloud, which hid the stars, and considerably obscured the moon. The Aurora shot across this cloud from N.N.W. to S.S.E., in the form of parallel arches, which emitted a bright yellowish-white light. The arches were of short duration, and when they disappeared, their site was observed to be occupied by the unaltered stratum of cloud.

March 8, 1821. At 6 p.m., before the daylight was gone, the Aurora appeared in the S.E., stretching up towards the zenith. At seven, two faint arches crossed the zenith.—Twilight. The Aurora was bright and copious all the evening.

At 1h. (a. m. 9th,) it was extremely beautiful and brilliant, but its changes were too various and rapid to be described. Its intestine motions were curved, waved, and serpentine. Sometimes it appeared in large masses like the modification of cloud, termed the cumulus; at other times it assumed the curtain-like appearance formerly described; and occasionally it split into beams varying much in altitude, but generally perpendicular to the horizon. One of its forms was very remarkable. It was a hollow truncated cone of light, formed of rays originating about 20° about the horizon, on every side, and terminating about 3° or 4° from the zenith. These rays had much lateral motion, and emitted a most brilliant green light, intermixed with a bright purple. Their convergence was very regular, and had they been prolonged, they would have terminated in the zenith. The cone was, in fact, the phenomenon we have termed Corona Borealis, with beams longer than usual.

March 11th, 1821. At midnight, a zone of light was observed extending from the E. to the N.W., lying about 20° above the horizon, and emitting a yellowish-grey light. This zone exhibited some intestine motion, but it was faint, and consisted rather of a brightening up and fading away again of the light, than of flashes. At this time sounds were heard at intervals of from 5 to 10 minutes to a few seconds, resembling the noise of a wand waved smartly through the air. The sounds appeared to issue from various parts of the sky, and as they were frequently simultaneous with a brightening of the Aurora, I was at first inclined to regard them as reports of its motions, but Mr. Wentzel stated them to arise from the contracting of the snow upon the sudden increase of cold, and his opinion was further supported by the same sounds being heard next morning. We heard in the evening from 50 to 100 of the reports, and they continued nearly as frequent after the Aurora had almost faded away, as when it was brightest.

The air was not very favourable for the transmission of sound, as the rapid was scarcely audible.

End of Dr. Richardson's Observations on the Aurora.

No. IV.

REMARKS AND TABLES CONNECTED WITH ASTRONOMICAL OBSERVATIONS.

DIURNAL VARIATION OF THE MAGNETIC-NEEDLE.

The Tables Nos. IV., V., VI., contain the monthly averages of a series of mean diurnal variations; the two first have been deduced from the preceding Tables, Nos. I. and II., and the third from observations on the position of the needle at Slave Lake, which, in consequence of their length, are not inserted in this work. Table IV. was extracted from Mr. Hood's Journal, where it is accompanied with these remarks: "The following table contains the mean diurnal variations of the compass for four months, at Cumberland-House. Many unavoidable interruptions prevented the number of days in each month from being complete, and some irregularities have been caused by the motion of the compass box. Those days are not included on which the needle was affected by the Aurora. As in other places, the diurnal variation increases with the advance of summer, and the needle reaches the extremes of variation at nearly the same hours. But the maximum is at the coldest period, and the minimum at the warmest, which is the reverse, I believe, of the observations which have been made in Europe and in the East Indies."

Table V. is an abstract of my observations on the positions of the needle at Fort Enterprise (contained in Table II.) which have been reduced to the variation shewn by the same needle, on September 4, 1820.

In Table VI. the positions of the needle observed at Moose-Deer Island, in 1822, have been reduced to the mean variation obtained at that place in July, 1820.

It should be remarked, that the whole of the observations made on the positions of the needle at Fort Enterprise and Moose-Deer Island, have been used in forming the Tables V. and VI.

The appearance of the Aurora, and the disturbance it occasioned on the motion of the needle at Fort Enterprise, were so frequent, that the mean monthly variation must have been deduced from but few observations, if they had been rejected.

The circumstance of the mean variation being least at midnight there, and at Moose-Deer Island, was evidently caused by the frequent disturbance in the motion of the needle which the Aurora occasioned; for on those days when it was not visible, the mean diurnal variation followed the course Mr. Hood had observed it to do at Cumberland-House, being most easterly at the time of the first observation in the morning, and least between three and four in the afternoon. The change in the diurnal variation in these parts of North America seems to be governed by the same law as that in England, as the decrease in easterly variation between the morning and afternoon, is in fact a motion of the needle to the westward.

TABLE IV.—The mean Diurnal Variation of the Compass for four Months, were observed at Cumberland House by Lieutenant Hood, R.N., lat. 53° 56′ 40″ N., long. 102° 16′ 41″ W. Dip 83° 12′ 50″.

Months.	8 A.M.	9 A.M.	1 P.M.	4 P.M.	8 P.M.	12 P.M.
1820	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
February	. . . .	17 16 0 E	17 11 2	17 9 9	17 12 4	17 13 0
March	. . . .	17 14 9	17 9 5	17 9 7	17 12 1	17 13 4
April	17 15 7 E	. . . .	17 8 8	17 9 6	17 12 3	17 13 9
May	17 16 9	. . . .	17 7 8	17 8 3	. . . .	17 14 7

TABLE V.—Monthly Abstract of Diurnal Variation, observed at Fort Enterprise. Lat. 64° 28′ 24″ N., Long. 131° 6′ 00″ W. Dip. 86° 58′ 42″.

	Variation East	Variation East	Variation East	Variation East	Variation East	Variation East	Variation East
1821	° ′ ″ At 10 A.M.	° ′ ″ Noon	° ′ ′ 2 P.M.	° ′ ″ 3 P.M.	° ′ ″ 6 and 5 P.M.	° ′ ″ 9 P.M.	° ′ ″ Midnight
January	36 27 57	36 22 09	36 12 39	36 12 03	36 18 57	36 16 09	36 09 09
	9 A.M.				5 and 4 P.M.		
February	36 31 45	36 21 57	36 17 27	36 15 51	36 13 03	36 13 51	36 11 57
	8 A.M.				4 P.M.		
March	36 29 36	36 17 21	36 21 09	36 10 45	36 06 15	36 06 37	36 12 33
	7 A.M.				5 P.M.		
April	36 07 45	36 06 03	. . .	36 02 51	36 00 15	35 55 15	35 40 03
	7 A.M.						
May	36 42 03	36 29 45	. . .	36 21 09	36 14 57	36 12 09	36 11 33

Mean Variation observed with the Needle attached to the Transit Instrument, placed at a greater distance from the Buildings at Fort Enterprise.

	8 and 9 A.M.	Noon	4 and 5 P.M.	9 and 10 P.M.	Midnight
Between May 12 and June 13, 1821 .	° ′ ″ 37 25 5 E	° ′ ″ 37 24 1	° ′ ″ 37 26 1	° ′ ″ 37 22 8	° ′ ″ 37 23 0 E

TABLE VI.—Monthly Abstract of Diurnal Variation, observed at Moose-Deer Island, Slave Lake, lat. 61° 11′ 8″ N., long. 113° 51′ 37″ W.

	Variation East	Variation East	Variation East	Variation East	VariationEast	Variation East
1822	° ′ ″ from 7 A.M. to 9 or 10 A.M.	° ′ ″ Noon	° ′ ″ 3 P.M.	° ′ ″ 5 P.M.	° ′ ″ 9 P.M.	° ′ ″ Midnight
January . . .	25 42 52	25 42 23	25 41 12	. . .	25 40 42	25 39 55
February . .	25 40 10	25 38 56	25 38 09	25 39 27	25 39 07	25 37 26
March . . .	25 40 52	25 39 06	25 37 50	25 37 16	25 37 47	25 35 02
April	25 42 16	25 40 23	25 38 21	25 38 10	25 38 49	25 38 15
Mean of the three complete Months, Feb. March, and April	25 41 06	25 39 28	25 38 07	25 38 18	25 38 34	25 37 14

REMARKS ON TABLE No. VII.

The following Table, No. VII., contains the results of the observations made during the progress of our journey in America, and along the Arctic Sea, which have been used in the construction of the maps. The intermediate parts were laid down by the courses corrected for variation and the estimated distances. The observations for latitude and longitude were made by myself, except those to which a name is affixed. The sun's azimuth, from whence the variations were deduced, were generally observed either by Mr. Back or Mr. Hood, whilst I took the corresponding altitudes with the artificial horizon. The letters B., H., and F., denote by whom the observations were taken.

The chronometers were either worn in our pockets, or, in the colder weather, suspended round our necks, inside of our dresses, and were necessarily much shaken from our mode of travelling; but, on the whole, they preserved their rates more steadily than might have been expected, especially that of Baird's, No. 1733. We ascertained their rates as often as an opportunity offered, and those assigned to them, on leaving Cumberland-House, Fort Chipewyan, and Fort Enterprise, were fixed by a series of observations. Previous to the commencement of our journey from the latter place in particular, care was taken to render them as correct as possible. Several observations of the transit of the sun and the star Arcturus over the meridian, as well as equal altitudes and separate observations of the sun's lower and upper limbs were observed. The longitudes, from whence their errors for mean Greenwich time were deduced at each of the different stations, were procured in the following manner: That of Cumberland-House was ascertained by the mean of the chronometers, shewn by an observation on the day of our arrival. The longitude of Fort Chipewyan was determined by several lunar observations on each side of the moon, the mean of those of ☉ E. ☽ being 111° 17′ 38″ W., and of those of ☾ W. ☽ 111° 20′ 12″ W. The longitude of Fort Enterprise was obtained in the following manner: The mean of the chronometers gave 113° 2′ 37″ W., at the time of our arrival in August, 1820; but that of 1733, which was found by subsequent observations to have preserved its rate more steadily than the others, was 113° 4′ 26″ W. The mean of several sets of lunars in this month gave ☾ E. ☽ 113° 3′ 56″ W., but the corresponding observations ☉ W. ☽ could not then be obtained.

In the month of May, 1821, several sets of lunars were observed, on each side of the moon, which gave a result of 113° 8′ 12″ W. The mean between this longitude, and that shewn by all the chronometers, is 113° 5′ 24″ W., and between it and the result of 1733 is, 113° 6′ 19″. Fort Enterprise was therefore placed in 113° 6′ 00″ W.

It has already been remarked, in the narrative of occurrences at Fort Enterprise, that we found the errors of the sextant materially changed, that the glasses had lost their parallelism, and the graduated arches of the sextants were warped, owing to the contraction of the brass during the intense frosts of the winter; and it is to the error produced by this cause alone, that I attribute the very great difference between the results of our observations on each side of the moon, in the spring of 1821. This difference exceeded two degrees with each of the sextants. The observations of ☉ E. ☽ being 112° 3′ 49″ W., and of those of ☉ W. ☽, 114° 12′ 35″ W. From this circumstance, it is obvious that the observations then obtained, of ☉ W. ☽, could not, with any regard to accuracy, be used with those procured on the opposite side in the autumn of 1820.

Advantage was taken of every opportunity to ascertain the rates of the chronometers, during the descent of the Copper-Mine River, and in the subsequent journey along the coast; and whenever we were assured, by good observations, of their having altered, a correction was then made. At other times, their rate of going was usually seen by comparison with 1733.

On the return of the Expedition to Wilberforce Falls, the chronometers were found to have altered their rates so much, as to give the longitude of the first cascade in Hood's River forty miles westward of what they had done twenty-four days before. Other rates having been procured during our stay near these Falls, a proportional allowance was made, to be applied to the results of all the observations by the chronometers, between Goulburn's Islands and Point Turnagain. The book, containing the longitudes thus corrected, having been lost by the accident of September 14th, as detailed in the Narrative, we could not use them in constructing the map; but as the latitudes observed between these parts agreed so nearly with what the reckoning gave, as deduced from the bearings of the different points and estimated distances, I thought it best to lay down that part of the coast from dead reckoning corrected by latitudes, rather than by the uncorrected longitudes, as we perceived the shape of the land would have been much distorted by using them. Point Turnagain is, therefore, placed in 109° 25′ W., instead of 110° 5′ 15″ W., its longitude by the chronometers.

General Remarks on the Variation of the Compass, observed during our Journey in North America, and along the Arctic Sea.—The Compasses used were of Captain Kater's improved Construction.

The results of the observations obtained in Hayes, Steel, and Hill Rivers, (lying between the latitudes 57° 00′ N., and 55° 14′ N., and longitudes 92° 26′ W., and 94° 22′ W.,) were so very variable, that no inferences can be drawn from them as to any proportionable increase or decrease of variation in advancing to the westward; and it would be difficult to assign any cause for these irregularities in the two lower rivers, whose banks are entirely composed of alluvial soil. The rocks in Hill River occasionally contained magnetic iron ore.

As we advanced to the westward from Hill River to Carlton, (latitude 52° 51′ N., and longitude 106° 3′ W.,) we found the easterly variation to increase in the mean ratio of fifty-two minutes for each degree of longitude. I am of opinion, that this augmentation of the variation was not owing to the small angle which our route made to the southward. From Carlton we advanced to the northward, by Isle à la Crosse to the Methye Lake, and found that the variation did not increase with the latitude; which confirmed me in the opinion just stated, that in these parallels the variation was not affected by a change of latitude; or in other words, that the lines of variation run nearly north and south in that quarter. In proceeding from the Methye Lake down the Clearwater River, which runs from east to west, an increase of variation was observed, nearly equal to what occurred in a similar change of longitude, farther to the southward; but in descending the Athabasca River, upon nearly a north course, the variation decreased a degree and half, notwithstanding a small increase of westerly longitude.

We had not an opportunity, during the descent of Slave River, of making a sufficient number of observations to ascertain whether the variation increased regularly with the longitude; but at Moose Deer Island, (bearing N. 26° W., 168 miles from Fort Chipewyan,) the variation was found to be 2° 51′ greater than at the latter place.

After leaving Moose Deer Island, and proceeding to the northwards across Slave Lake, the variation, contrary to the law it had hitherto followed, increased with an increase of latitude. At an island adjoining to Isle la Cache of Mackenzie, (bearing N. 20° E, forty-two miles of Moose Deer Island,) the variation was 5° 20′ greater; and at Fort Providence, bearing N. 40° W., and thirty-five miles from the latter place, a farther increase of 2° 33′ was observed; making, at that place, a total of 7° 55′ E. The fishermen at Fort Providence occasionally collect pieces of magnetic iron ore in their nets, and it is probable that the same ore may occur among the

Rein-deer and other islands on the northern side of the lake, and cause the increase of variation which we have observed.

Departing from Fort Providence, no material change in the variation took place for the distance of seventy-six miles on N. 3° E. course; but on advancing sixteen miles further on a N. 27° E. course to Upper Carp Lake, the variation increased 4° 15′. It continued stationary until we reached the portage next beyond Grizzle Bear Lake, a distance of thirty miles, but decreased a degree between that place and Fort Enterprise, a distance of thirteen miles N. 8 W. true.

It may be remarked, that from the time we left Fort Providence, we travelled through a country composed of primitive rocks.

The proportional increase of variation in a degree of longitude, were in different quarters as follows:—Between York Factory and the Long Portage in Jack River, 2° 37′; between Jack River and Hill Gates, 55½ minutes; between Hill Gates and Norway House, 54¼ minutes; between Norway House and Cumberland, 41½ minutes; between Cumberland and Carlton House, 54¼ minutes; between Carlton and Green Lake, 58 minutes; and between the Methye Lake and the Forks of the Athabasca River, 50 minutes.

We found a considerable increase in the amount of variation between the observations made at Fort Enterprise in the autumn of 1820 and the spring of 1821, as shewn both by Kater's compass and the needle attached to the transit instrument. Being at a loss to assign any other cause for these differences than a change in the poles of the needles during the interval, I shall state the particulars to enable others more conversant in these matters, to judge for themselves.

On August 21st, 1820, the variation shewn by Kater's compass, No. 2, which then agreed with No. 1, was 35° 48′ 21″ E. at four P. M. In the months of May and June 1821, it was ascertained to be 36° 24′ 7″ E. by means of several observations obtained between four and six P.M. with Kater's compass, No. 1, being an increase of 35′ 46″. On the 4th September 1820, the variation was 36° 15′ E., as shewn at noon by the needle of the transit instrument; and in the months of May and June, it was ascertained to be 37° 24′ E., by the means of several observations with the latter needle, making an increase of 1° 9′ from last observation. It should be observed that the compass No. 2, received some injury in the course of the winter, which was the cause of its not having been used in the spring of 1821.

The results of the azimuths procured, during the descent of the Copper-Mine River, follow the course which we had previously observed them to take, by shewing an increased easterly variation, as we proceeded to the north and westward. There was not, however, such regularity in the increase as to enable us to form any judgment as to the curves which the lines of variation make in these latitudes; and I deem it unfortunate that a continuation of cloudy weather prevented us from ob-

taining any observations for variation in crossing the Barren Grounds, when the expedition, on its return from the sea-coast, was passing over the same parallels of latitude, and much to the eastward of the Copper-Mine River, because azimuths obtained on that journey would have materially assisted in forming an estimate respecting these curves. I apprehend much of the irregularity in the results of the observations for the variation along the Copper-Mine River is to be attributed to local causes of attraction, and particularly to the existence of iron ore among the rocks, which is very general.

As we proceeded along the sea-coast to the eastward from the mouth of the Copper-Mine River to Bathurst's Inlet, the easterly variation decreased considerably, though there was not a material change in the latitude; but, in advancing to the north and westward from Bathurst's Inlet to Point Turnagain, the easterly variation increased again.

A greater intermixture of iron ore was perceived in the rocks on the sea-coast, than on the banks of the Copper-Mine River.

It should be observed that when we were at the first cascade in Hood's River on July 31st, we perceived the needles to traverse so sluggishly that it became necessary to retouch them with the magnets.

The remarks on the dip of the magnetic needle will accompany the Table which contains those observations.

TABLE VII.

Results of the Observations for Latitude, Longitude and Variation.

Date 1819	Latitude North	Longitude by Chronometer	Variation East	Place of Observation
Sept.	57 00 03	92 26 W.	6 00 21	York Factory.
A.M. 12	~~~~~~	93 1 37	9 5 5 H.	At the entrance into Steel River.
12	56 20 59	~~~~~~	~~~~~~	Steel River.
13	56 4 47	~~~~~~	~~~~~~	Steel River.
P.M. 13	~~~~~~	93 29 40	9 27 51	Steel River.
19	~~~~~~	93 51 38	7 48 24	North end of Brassa Portage in Hill River.
19	55 28 32	~~~~~~	~~~~~~	Between Lower Burnt Wood and Brassa Portages.
20	55 27 9	~~~~~~	8 30 0* H.	Lower swampy Portage, Hill River.
23	55 20 12	~~~~~~	~~~~~~	Sail Island.
P.M. 23	~~~~~~	94 21 07	8 40 0* H.	Lower Portage in Lower Jack River.
24	55 14 2	94 21 54	11 10 25 B. & F.	Long Portage in Lower Jack River.
25	~~~~~~	94 26 48	10 28 27 H. & F.	Upper Portage in Lower Jack River.
26	54 59 4	~~~~~~	11 50 0*	Near the Magnetic Island in Knee Lake.
A.M. 27	~~~~~~	95 21 9	~~~~~~	Trout Portage.
27	54 50 48	~~~~~~	12 40 0*	Second Portage in Trout River.
28	~~~~~~	95 27 59	~~~~~~	Oxford House.
30	54 39 47	~~~~~~	12 45 0 H.	Crooked Spout, Weepannah-pa-ness River.
Oct. 1	54 29 7	~~~~~~	13 20 0*	Between the first and second Portages in Hill's Gates.
1	~~~~~~	96 15 36	12 47 03 H.	Lower Portage in Hill's Gates.
2	~~~~~~	96 31 1	~~~~~~	North end of the White Fall.
2	54 23 29	~~~~~~	~~~~~~	South end of the White Fall.
5	~~~~~~	97 42 6	~~~~~~	Carpenter's Lake.
5	54 12 30	~~~~~~	15 0 0* H.	Sea River Portage.
7	53 41 38	98 1 24	14 26 6 H. & F.	Norway House.
Oct. 8	~~~~~~	98 49 58	~~~~~~	The bottom of Limestone Bay Lake Winnipeg.
8	53 45 58			
12	53 8 25	99 28 2	~~~~~~	Upper end of the Grand Rapid Portage.
13	~~~~~~	99 36 37	~~~~~~	East side of Cross Lake.
13	53 10 11	~~~~~~	~~~~~~	West side of Cross Lake.
P.M. 13	~~~~~~	99 44 49	~~~~~~	Cross Lake Portage.
14	~~~~~~	100 10 49	~~~~~~	An Island in Cedar Lake.
14	53 12 59	~~~~~~	~~~~~~	Cedar Lake.
16	~~~~~~	100 36 44	~~~~~~	Entrance of the Saskatchawan River.
16	53 27 29	~~~~~~	15 20 0 H.	Saskatchawan.
18	53 45 38	~~~~~~	~~~~~~	Saskatchawan.
Nov.	53 56 40	102 16 41	17 17 29 B. H. & F.	Cumberland House.
1820 Jan. 20	53 51 41	~~~~~~	~~~~~~	Entrance Sturgeon River, Saskatchawan.
22	53 36 01	~~~~~~	~~~~~~	Saskatchawan River.
24	53 19 5	~~~~~~	~~~~~~	Saskatchawan River.
P.M. 24	~~~~~~	104 4 52	~~~~~~	Near the Lower Nippiwan, Saskatchawan River.
27	53 17 58	~~~~~~	~~~~~~	Saskatchawan.
31	52 50 47	106 12 41	20 44 47 B. F.	Carlton House, Saskatchawan River.
Feb. 13	53 21 30	~~~~~~	~~~~~~	Near Stinking Lake.
13	~~~~~~	107 17 04	20 21 22 B.	Stinking Lake.
17	54 16 10	107 29 52	22 6 36 B. & F.	Green Lake.
	55 26 45	107 52 55	22 15 48 B. & F.	Isle à la Crosse.
Mar. 8	55 53 00	108 51 10	22 33 22 B.	At N. W. Company's Fort in Buffalo Lake.
12	56 24 20	109 23 4	22 50 28 B.	At H. B. Company's Fort in Methye Lake.
17	~~~~~~	111 8 42	24 18 20 B.	Near the Forks of the Elk River.

* Estimated by the Sun's bearings at noon.

Results of the Observations for Latitude, Longitude, and Variation, *continued.*

These observations were made by Lieutenant Hood, on his passage to Chipewyan from Cumberland-House.

Date 1820	Latitude North	Longitude by Chronometer	Variation East	Place of Observation
Mar. 19	57 24 07			Pierre au Calumet.
	58 42 37	111 18 20 By Lunars, east and west of the moon	22 49 32 B. & F.	Fort Chipewyan.
June				
A.M. 14		101 53 31		Sturgeon River.
14	54 20 10			Sturgeon River.
15		102 13 0		Ridge River.
15	54 39 49			Ridge River.
16		102 41 13		Pine Portage.
17		103 34 15		Frog Portage.
17	55 25 44			English River.
22	55 39 44			English River.
24		105 55 55	20 17 0	Pin Portage, English River.
24	55 44 55			Three miles from the Eastern entrance of Lake.
25	55 42 46			Entrance of Sandy Lake, English River.
26		106 46 22		In Knee Lake, English River.
28	55 26 45			Isle à la Crosse.
July 1		108 16 45		Near the South entrance of Clear Lake.
1	55 47 26			West side of Clear Lake.
1			21 15 10	Entrance into Buffalo Lake.
2	56 7 37			Buffalo Lake.
3		109 6 15		In the Methye River.
3	56 18 58			In the Methye River.
7	56 43 20	109 52 00	25 2 30	North side of Methye Portage.
11		110 49 20	25 40 30	Clear Water River.
11	56 39 43			Half a mile S.E. of the Elk River.
12		111 11 00	27 20 10	Elk River.
12	58 15 25			In the Elk River.
July 5	58 57 52	111 26 12		In Stony River.
19	59 52 16			Entrance of Dog River.
A.M. 24		113 25 36	27 25 14 H.	Just above the bend in Slave River.
24	60 54 52		26 45 0	Slave River.

Date 1820	Latitude North	Longitude by Chronometer	Variation East	Place of Observation
July 25	61 11 08	113 51 35	25 40 47 H. & F.	The N.W. Company's Fort at Moose-deer Island, Slave Lake.
28	60 50 18	113 21 41	31 2 06 H.	On an island near Isle la Cache, in Slave Lake.
30	62 17 19	114 9 28	33 35 55 B. & F.	Fort Providence.
Aug. 3		114 13 39	33 8 6	On an Island in Lake Prosperous.
3	62 40 21			Yellow Knife River.
4	62 51 2			Rocky Point below the Double Fall Portage.
4		114 25 38		Grassy Portage.
5	62 58 2			Island Portage.
7		114 27 9	33 4 00	Fishing Lake.
8	63 23 5			At the second Portage of the Nine Lakes.
9	63 30 56			On the River Portage.
9		114 2 2	32 30 40 B.	First Carp Portage.
11	63 40 26			Near the lower point of Upper Carp Lake.
11		113 46 35	36 45 30	The north end of Upper Carp Lake.
12	63 56 52			Near the north end of Rein-deer Lake.
13	64 2 19		37 19 00 H.	On the Portage next below Porphyry Lake.
14	64 6 47	113 25 00		North end of Hunter's Portage.
14		113 23 9		Between Hunter's Portage, and Orkney Lake.
15	64 9 14			Portage between Orkney and Sandy Lakes.
16	64 15 17	113 2 39	36 50 47 H. & F.	North end of Grizzle Bear Lake.
19	64 27 6			On the borders of the small river flowing into Winter Lake.
			35 48 21 H.	At Fort Enterprise: Kater's Compass in August, 1820.
	64 28 24	113 6 00 Mean of Lunars and Chronometers	36 15 00	Transit Instrument in August, 1820.
			36 24 7 B. H. F.	Kater's Compass in May and June, 1821.
			37 21 6	Transit Instrument in June, 1821.

Results of the Observations for Latitude, Longitude, and Variation, *continued.*

Date 1820	Latitude North	Longitude by Chronometer	Variation East	Place of Observation
	° ′ ″	° ′ ″	° ′ ″	
Sept. 9	64 34 52			Near the Dog Rib Rock.
10	64 45 20			
10		113 5 46		
11	64 57 7			
12	65 9 6			On the S.E. border of an arm of Point Lake.
12		112 57 25		Among some Pines S. 14, W. $3\frac{1}{4}$, from the main channel of Point Lake.
1821				
June 21		113 8 25	43 4 20 H.	At the part of Point Lake from whence the Expedition commenced their Journey in 1821.
30	65 31 30 D. R.	114 30 00 D. R.	39 42 36 B.	Red Rock Lake.
July 2	65 43 28	114 26 45	42 17 22 H.	Copper Mine River.
5	66 5 00	114 25 15	42 58 34 H.	At the junction of the White Sandy River with the Copper Mine River.
			44 00 50 H. Compass shaken by the wind	
6		115 25 43	48 00 34 H.	At the base of a range of Granitic Mountains, Copper-Mine River.
7	66 45 11	115 42 23	47 7 30 H.	Hook's encampment, Copper Mine River.
9	67 1 10	116 27 28	44 11 43 H.	About three miles below the Rocky Defile Rapid.
12	67 23 14	116 6 51	49 46 06 H.	Between the Musk Ox and Sand-Stone Rapids.
15	67 39 35			Copper-Mine River.
16	67 42 35	115 49 33	50 20 14 H.	Bloody Fall of Hearne.
19 & 21	67 47 50	115 36 49	46 25 52 B.	Mouth of the Copper-Mine-River.
23	67 42 15	112 30 00	47 37 42 H.	Port Epworth.
25	67 53 45	110 41 20	40 49 00 H.	Detention Harbour.
27	67 53 12			Galena Point.
29	67 30 12			On the west side of Arctic Sound.
31	67 19 23	109 44 30	41 43 22 H.	Lower Rapid in Hood's River.
Aug. 3	67 20 12			Bathurst's Inlet

Date 1821	Latitude North	Longitude by Chronometer	Variation East	Place of Observation
	° ′ ″	° ′ ″	° ′ ″	
Aug. 3		108 38 00		Near a remarkable white Cliff on the west side of Bathurst's Inlet.
10	67 40 30 D. R.		41 9 40 H.	Near the eastern entrance of Bathurst's Inlet.
11	67 45 54			About three miles from Point Everitt.
12	68 1 20			Melville Sound.
13	68 6 10			Hope's Bay, Melville Sound.
17	68 18 50	110 5 15* The Chronometers having been found too far West, 109.25, was used in constructing the map	44 15 46 H.	A point near to Point Turnagain.
27	67 12 14			
29	67 7 4	109 48 15	40 37 42 H.	About $\frac{3}{4}$ of a mile below the falls of Wilberforce.
Sept. 4	66 40 42			
9	66 13 51	111 26 15		Congecatha-wha-chaga of Hearne.
14	65 57 43			About $2\frac{1}{2}$ miles south of Belanger's Rapid.
21	65 7 6			
22		111 59 48		On the borders of an arm of Point Lake.
26	65 00 00			Obstruction Rapid.

* On the return to Hood's River, the Chronometers were found to have altered their rates considerably after our departure from Arctic Sound, giving the longitude too far west; and in consequence of this change the coast from Bathurst's Inlet to Point Turnagain by the course and distance daily given, and the spot, is placed in Longitude 109° 25′ 00″.

REMARKS ON THE DIP OF THE MAGNETIC NEEDLE.

Previous to our departure from London the instrument was compared, and found to agree with an excellent dipping-needle belonging to Henry Browne, Esq., of Portland Place, which was afterwards used on Captain Parry's late Expedition to the Polar Sea. One of the sides of our needle was marked with a +, and it was balanced with that mark towards the observer, in which position it hung when the single observations given in the subsequent Table were made; but, whenever two results are put down, the needle was inverted, and it is to be remembered the upper one is the dip shewn with the marked side towards the observer. The initials B., H., F., indicate by whom the observations were made, and the mean result is given.

The observations made at York Factory, Norway House, and Cumberland House, shew an increase of dip in proceeding to the south-west. Mr. Hood's observation made in the spring at Cumberland House, compared with mine of the preceding autumn, shew an increase of 1° 32′ 48′ in that interval. At Isle à la Crosse, bearing about W.N.W. from Cumberland House, the dip was found by Mr. Hood to be less than at Cumberland House; but beyond that place we found that the dip increased with the latitude, whether our course laid to the eastward or westward of the meridian. It is to be observed, however, that the places where observations were made, were perhaps too distant to enable us to deduce any general law. The great dip observed at Point Turnagain, would appear to evince the proximity of that station to the magnetic pole.

The column of differences produced by changing the face of the instrument exhibits a remarkable variation in these differences connected in some manner with the place of observation, and which have not been noticed I believe by any previous observer. I leave to others better informed on these matters than myself, to determine whether they ought to be ascribed to local causes, to some defect in the instrument, or to a general law of magnetism.

The dip was always greatest when the face of the instrument being to the west, the needle hung with the marked side to the observer; and least when the marked side was from the observer, the instrument still facing to the west. The dips, when the instrument was faced east, were intermediate between these extremes; but in this case, when the marked side was turned to the observer, it was less than when turned from him, which is contrary to what is stated above, as taking place when the instrument was faced west. These facts may, perhaps, be deemed to indicate some defect in the balancing of the needle, or in the correctness of the pivots upon which it turned.

TABLE VIII.

An Abstract of the Observations made on the Dip of the Magnetic Needle, between York Factory and Point Turnagain.

Date 1819	Latitude North	Longitude West	Amount of Dip	Difference produced by changing the Face of the Instrument	Variation East	Ther.	Direction of Winds, and State of Atmosphere	Place of Observation	Observer
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	°			
Sept. 4	57 00 03	92 26 00	79 29 7	11 3 40	6 00 21	+43	ESE. moderate and cloudy	York Factory	B.H.F.
26	54 57 4	94 56 30	80 37 50	3 45 20	11 50 0	+56	SE. moderate, very clear	Magnetic Island, Knee Lake	F.
Oct. 7	53 41 38	98 00 52	83 40 10	7 39 00	14 21 41	+44	North, moderate and clear	Norway House	F.
Nov. 24	53 56 40	102 16 31	83 9 45	13 3 6	17 17 29	+24 In the room +15 In the air	North, light breezes, clear	In a room at Cumberland House	F.
Dec. 1	53 56 40	102 16 31	83 12 40	12 50 55	17 17 29	+29	North, light airs,	In the air at C. House	H F.
1820									
June 11	53 56 40	102 16 31	84 45 48 84 24 40	17 48 03 19 17 40	17	Marked towards Needle	side of the needle the observer. . . inverted	Cumberland House	H.
29	55 26 45	107 52 45	84 5 25 84 21 50	16 29 30 17 43 20	25 15 48	+68	ENE. moderate, clear	Isle à la Crosse	H.
July 9	56 43 0	109 53 0	85 9 30 85 5 40	6 39 40 9 21 00		+62	NE. fresh, cloudy	North side of Methye Portage	H.
14	58 42 38	111 18 55	85 23 42	6 2 10	22 47 34	+68	East, light breezes, clear	Fort Chipewyan	B.H.F.
Aug. 1	62 17 19	114 9 34	86 38 02	6 49 57	33 35 55	+72	SE. light airs, very clear	Fort Providence, N. side of Slave Lake	B.H.F.
11	63 47 49	113 46 35	87 11 48	7 4 3	36 45 30	+56	East, light airs, very clear	Upper Carp Lake	B.H.F.
16	64 15 17	113 2 39	87 20 35	7 13 37	36 50 47	+77	South, light airs, clear	Portage at the North end of Grizzle Bear Lake	B.H.F.
30	64 28 24	113 6 00	87 25 57	6 44 54	35 45 28 36 15 0	+55	NNW. light airs, clear	Fort Enterprise	F.
1821									
June 9	64 28 24	113 6 00	87 3 13 86 54 12	15 56 03 19 45 54	36 24 7 37 24 0	+73	SE. light breezes, stratified clouds	Fort Enterprise	F.
10	67 2 20	116 28 00	87 28 12 87 34 24	16 39 24 15 34 36	44 11 42			Below the Rocky Defile Rapid, Copper Mine River	F.
21	67 47 50	115 36 49	88 3 27 88 6 48	6 28 54 9 21 12	46 25 52	+49	NNE. light b. foggy	Mouth of the Copper Mine River	F.
31	67 19 23	109 44 30	88 54 57 89 2 30	5 20 42 1 20	40 59 23	+63	WSW. moderate b. streaked clouds	The first Cascade in Hood's River	F.
Aug. 20	68 18 50	109 25 D.R. 110 5 Chr.	89 56 3 89 6 21	2 42 30 0 24 54	44 15 46	+33	SW. fresh breezes, dark clouds.	Point Turnagain	F.

MAGNETIC FORCE.

The Observations for ascertaining the Magnetic Force were made with the Dipping Needle, which was six inches in length. The needle was brought to a horizontal position by a magnet, and being then permitted to swing freely, the number of vibrations were counted, and the time noted until it rested and pointed to a degree on the graduated circle, which is called the Arc in the table. The interval shews the time that it did vibrate, and the next column the number of vibrations.

The instrument was not of the best kind for making with accuracy such delicate observations, and our results may, perhaps, be considered as only approximations to the truth.

TABLE IX.

An Abstract of Observations on the Magnetic Force.

Date	Latitude North	Longitude West	Face of the Instrument East				Face of the Instrument West				Face of the Instrument West				Place of Observation	Temperature of the Air
			Arcs	Interval	No. of Vibrations	Interval of 10 Vibrations	Arcs	Interval	No. of Vibrations	Interval of 10 Vibrations	Arcs	Interval	No. of Vibrations	Interval of 10 Vibrations		
1819	° ′ ″	° ′ ″	° ′	′ ″		″	° ′	′ ″		″	° ′	′ ″		″		
Nov. 24	53 56 40	102 16 31	78 00	8 47	140	37.6	89 50	8 47	130	40.5	85 20	8 40	130	40.0	In a room at Cumberland-House	+24 room −15 air
			77 40	9 15	140	39.6	89 50	8 47	130	40.5	84 50	9 04	136	40.1		
Dec. 1	~~~	~~~	76 45	9 29	143	39.8	89 45	9 50	140	41.3	~~~	~~~	~~~	~~~	In the air at Cumberland-House	+ 29
1820																
June 29	55 26 45	107 52 45	77 08	13 19	188	42.6	87 55	10 40	149	40.3	~~~	~~~	~~~	~~~	Isle à la Crosse, by Mr. Hood	+ 68
July 9	56 43 0	109 53 0	80 47	12 26	170	42.1	88 45	11 55.5	169	42.3	~~~	~~~	~~~	~~~	Methye Portage, by Mr. Hood	+ 62
14	58 42 38	111 18 55	82 25	9 45	140	41.8	87 35	9 33	136	42.1	86 20	9 41.3	150	38.8	Fort Chipewyan	+ 68
Aug. 1	62 17 19	114 9 34	83 50	11 57	155	46.3	89 10	12 39	190	40.0	87 00	13 18	200	39.9	Fort Providence	+ 72
30	64 28 24	113 6 00	83 15	9 46	133	44.1	89 30 90 05	11 45 12 10	160 173	44.1	93 30	10 37	162	39.9	Fort Enterprise	+ 55
1821																
June 9	~~~	~~~	77 50	8 48	123	42.9	96 30	6 40,5	94	42.6	81 10 Face of 97 48	7 11 the In 9 11.5	100 strument 124	43.1 South 44.5	Fort Enterprise	+ 73
July 31	67 19 23	109 44 30	86 55	7 48	113	41.4	89 40	8 36	124	41.6	88 20	9 51	150	39.4	First Cascade in Hood's River	+ 63

TEMPERATURES.

To prevent too great an extension of the Appendix, I have compressed the Tables of Weather as much as possible. The temperatures, &c., are given at length for five months of the coldest season we passed at Fort Enterprise in the account of the Aurora; and Tables 10 and 11, contain monthly abstracts for two years, from observations made at Cumberland-House, at Fort Enterprise, and the intermediate country. In Table 12, there is an abstract of the wind and weather for 1820-1821, the year in which, from our being so long stationary at Fort Enterprise, observations of that kind were of more value than they could be during our journeys from one part of the country to another.

These different tables, then, contain pretty full accounts of the state of the thermometer, winds, and weather, at Fort Enterprise; and I have been the less anxious to add those observations made in more southerly districts, because the traders at many posts keep registers of the weather, some of which have been published. The tables are so simple as to be easily understood, and it is unnecessary for me to describe at length, the manner in which they were constructed. Copies of the whole of the Meteorological Observations have been lodged at the Admiralty.

TABLE X.

EXTREMES OF THE

Months	Highest Temperature	Lowest Temperature	Lowest daily maxima	Highest daily minima	Highest Morning Observations	Lowest Morning Observations	Highest Evening Observations	Lowest Evening Observations	Greatest range in 24 hours	Lowest range in 24 hours
1819 Sept.	+61°	+30°	+39°	+53°	+57°	+30°	+58°	+35°	37°	4°
Oct.	+55	+19	+27	+10	+40	+19	+52	+20	43	4
Nov.	+45	−20	− 5	+36	+37	−20	+37	−16	35	2
Dec.	+40	−31	−22	+31	+31	−31	+40	−28	49	2
1820 Jan.	+10	−44	−26	+ 2	+ 5	−44	+10	−30	58	6
Feb.	+20	−34	−10	+ 8	+ 8	−34	+12	−25	55	10
March	+54	−22	− 3	+22	+22	−22	+35	−15	81	11
April	+77	−13	+10	+49	+49	−13	+74	+ 4	69	12
May	+84	+20	+26	+60	+60	+20	+69	+23	62	11
June	+87	+42	+52	+64	+64	+42	+76	+48	70	13
July	+84	+47	+56	+62	+68	+47	+72	+50	63	18
August	+78	+33	+44	+64	+65	+33	+68	+33	69	10
Sept.	+53	+16	+31	+36	+40	+17	+49	+16	40	5
Oct.	+37	+ 5	+19	+34	+34	+5	+35	+11	30	5
Nov.	+25	−31	−20	+18	+20	−31	+18	−26	25	4
Dec.	+ 6	−57.5	−52	zero	zero	−52	+ 4	−57.5	33	2
1821 Jan.	+20	−49	−40	+ 2	+13	−49	+12	−48	48	3
Feb.	+ 1	−51	−41	−12	− 7	−51	− 9	−48	41	7
March	+24	−49	−26	+ 8	+10	−49	−12	−36	64	24
April	+40	−32	−14	+15	+30	−20	−19	−24	71	22
May	+68	+ 8	+26	+35	+52	+20	+43	+12	75	23

TABLE XI.

MEANS OF THE

Months	Highest Temperature	Lowest Temperature	Of these two	Morning Observations	Evening Observations	Morning and noon Observations	Morning & evening Observations	Three Observations	Whole range	Mean range
1819 Sept.	+51.20°	+42.77°	+47.00°	+43.73°	+46.70°	+47.3°	+45.2°	+47.1°	525.	17.50°
Oct.	+42.7	+31.1	+36.9	+31.6	+35.8	+36.8	+33.7	+36.46	766.	24.7
Nov.	+20.2	+11.0	+15.6	+13.0	+14.4	+16.5	+13.7	+15.8	555.	18.5
Dec.	+ 7.6	− 1.2	+ 3.2	− 0.9	+ 2.9	+ 2.5	+ 1.0	+ 3.9	651.	21.2
1820 Jan.	− 7.3	−19.1	−13.2	−19.5	−13.5	−13.9	−16.5	−13.7	813.	26.2
Feb.	+ 5.5	− 7.6	− 1.1	− 6.3	− 3.0	− 0.3	− 4.6	−1.2	759.	26.2
March	+21.8	+ 2.4	+12.1	+ 4.5	+10.6	+13.0	+ 7.5	+12.2	1139.	36.8
April	+43.5	+26.5	+35.0	+26.8	+33.5	+35.1	+30.2	+34.5	979.	32.6
May	+59.2	+40.9	+50.0	+41.6	−47.4	+50.6	+44.5	+49.5	1100.	35.5
June	+66.3	+51.2	+58.8	+51.7	+57.5	+59.5	+54.6	+58.5	883.	29.4
July	+70.5	+53.2	+61.8	+53.5	+60.0	+61.8	+56.7	+61.2	~~~	32.8
August	+62.8	+49.7	+56.2	+51.5	+53.4	+56.8	+52.4	+52.3	802.	25.9
Sep.	+39.3	+28.3	+33.8	+29.8	+32.4	+34.5	+31.1	+33.8	625.	20.8
Oct.	+27.9	+18.8	+23.4	+20.9	+21.0	+24.4	+21.0	+23.3	535.	17.3
Nov.	+ 2.8	− 4.3	− 0.7	− 2.3	− 1.6	− 0.2	− 2.0	− 1.0	384.	12.8
Dec.	−25.8	−33.5	−29.6	−30.5	−31.9	−29.1	−31.2	−30.0	520.	17.10
1821 Jan.	− 9.68	−21.5	−15.6	−17.3	−15.7	−15 6	−14.8	−15.6	684.	22.1
Feb.	−19.1	−31.6	−25.3	−28.7	−26.5	−24 5	−27.6	−25.2	619.	22.1
March	− 0.9	−22.3	−11.6	−19.9	−14.0	−11.2	−17.0	−12.2	1235.	39.8
April	+16.4	− 7.1	+ 4.6	+ 5.9	+ 0.1	+11.5	+ 2.9	+ 7.6	1330.	44.3
May	+42.8	+20.3	+31.6	+35.5	+26.4	+36.5	+31.0	+33.7	1276.	41.1

TABLE XII.

General View of the Winds and Weather for One Year, 1820-1821.

Months	Winds		Fair days	Rainy or snowy days	Clear days	Cloudy days	REMARKS
	Easterly	Westerly					
Sept. 1820	15	15	14	16	$8\frac{1}{3}$	$21\frac{2}{3}$	Rain on 8 days, snow on 15=Total 16.
October . .	$22\frac{1}{3}$	$7\frac{2}{3}$	18	13	$6\frac{2}{3}$	$24\frac{1}{3}$	Rain on 3, snow 9, hail 1=13.
November .	$18\frac{2}{3}$	$11\frac{1}{3}$	21	9	11	19	Snowy days 9
AUTUMN	56	34	53	38	26	65	
Dec. 1820	$10\frac{3}{4}$	$20\frac{1}{4}$	23	8	20	11	Snowy days 8.
Jan. 1821	14	17	21	10	$10\frac{1}{3}$	$20\frac{2}{3}$	Snowy days 10.
Feb. . . .	$15\frac{1}{2}$	$12\frac{1}{2}$	19	9	$14\frac{2}{3}$	$13\frac{1}{3}$	Snowy days 9
WINTER	$40\frac{1}{4}$	$49\frac{3}{4}$	63	27	45	45	
March, 1821	$15\frac{3}{4}$	$15\frac{1}{4}$	22	9	$18\frac{2}{3}$	$12\frac{1}{3}$	Snowy days 9.
April . .	18	12	19	11	13	17	Snowy days 11.
May . . .	24	7	24	7	$10\frac{1}{3}$	$20\frac{2}{3}$	Snowy 6, rainy 1, foggy 4.
SPRING	$57\frac{3}{4}$	$34\frac{1}{4}$	65	27	42	50	
June, 1821	24	6	21	9	14	16	Snowy 4, rainy 9, foggy 4, hail 1=9.
July . . .	$17\frac{1}{2}$	$9\frac{1}{2}$	24	4	13	15	Thunder 5, (three days omitted).
August . .	15	15	22	9	14	17	Rainy 9.
SUMMER	$56\frac{1}{2}$	$30\frac{1}{2}$	67	22	41	48	
Total for the Year	$210\frac{1}{2}$	$148\frac{1}{2}$	248	114	154	208	

The easterly winds predominate in the country to the northward of Great Slave Lake, as appears on a reference to the Table; and whilst they continue to blow, the weather is milder than during the westerly winds. In December and January, the coldest months, the latter prevailed. The coldest, and I may add, the strongest, wind in every season in this country, is the NW. The easterly, southerly, and westerly winds were almost invariably accompanied by clouds and snow, especially the two former. The thermometer was generally lowest on clear nights, when the sky was of a deep blue; and the blue sky invariably appeared at Fort Enterprise, when the temperature was below $-40°$. A strong wind always raised the thermometer, though it blew from the coldest quarter, and clouds, though unaccompanied by wind, had the same effect.

During our residence in the country, we had many opportunities of confirming the remarks in Captain Parry's Voyage, (page 143,) respecting the distance which sound is conveyed in intense cold weather.

TABLE XIII. Observations on the Passage to Hudson's Bay.

Date, 1819	Latitude	Longitude, Chronometer.	Variation, West	Places to which the Observations are reduced
June 17	58° 56′ 22″	4° 24′ 14″	~~~	The Stack Rock.
18	59 7 48	~~~	~~~	S. W. Point of Rona.
		5 49 59	~~~	N. E. Point of Rona.
	59 7 54	~~~	~~~	Centre of Barra.
		6 12 8	~~~	N. W. Point of Barra.
20	58 16 20	7 39 47	~~~	Eastern Flannen Island
July 2	58 33 D.R.	21 00 D.R.	35 45 Az.	
18	58 2 D.R.	38 10 D.R.	42 58	
Aug. 3	59 48 D.R.	59 53 D.R.	52 41 Az. Amplitude 53 32	
5	61 39 D.R.	61 31 D.R.	54 24 37	
	61 35 11	64 29 3	Chr. 54° 26′	East Bluff, Resolution Island.
		64 35 42	Lun.	
	61 33 18	64 25 32	Chron.	Some dangerous Rocks lying S. 32 E. true of East Bluff.
		64 32 10	Lunar's	
	61 22 12	64 34 52	Chron.	Cape Resolution.
		64 44 31	Lunar's	
	62 11 41	69 54 14	~~~	Saddle-back Hummock Hudson's Straits.
12	62 8 D.R.	68 52 D.R.	58 38 32 Amplitude	Hudson's Straits.
13	62 13	~~~	58 33	On board the Eddy-stone.
	62 13	~~~	58 00	On board the Prince of Wales.
Aug. 13	62° 31′ 45″	70° 13′ 27″	Chron.	Centre of Upper Savage Island.
		70 20 6	Lunar's	
14	61 57 55	72 4 25	Chron.	Centre of Prince of Wales' Island.
		72 11 4	Lunar's	
16	62 38 D.R.	~~~	58 18 45	Mid Channel between Cape Charles and the Upper Savage Islands.
	62 47 18	73 48 50	C. 58 By Sun's bearing at noon.	East end of Charles' Island.
		73 55 29	L.	
18	62 48 12	74 8 02	Chron.	West end of Charles' Island.
		74 14 39	Lunar's	
	62 36 17	78 16 52	~~~	Western point of the groupe of Digges Islands.
21	60 47 31	79 57 23	Chron.	Cape Smith on the west coast of Labrador.
		80 4 02	Lunar's	
23	59 42 8	80 24 13	~~~	Centre of the Great West Sleeper.
		80 30 52		
25	57 34 D.R.	83 8 D.R.	33 17 55	Hudson's Bay.
29	57 12 49	90 50 36	Chron.	Cape Tatnam.
		90 57 15	Lunar's	
	57 25 D.R.	~~~	3 23 30	Between Cape Tatnam and York Flats.
	57 00 03	92 26 00	6 00 21 East	York Factory.

No. V.

ZOOLOGICAL APPENDIX.

BY

JOSEPH SABINE, ESQ.

THE information supplied to Zoologists, from the discoveries and observations made by Captain Franklin and his companions, is not less relatively advantageous, than the benefits which have accrued to natural philosophy and geography, from the result of their labours and exertions in the more important objects of their mission. To Dr. Richardson, under whose care the departments of natural history were more especially placed, all who feel interested in or derive gratification from the advancement of that science, are particularly indebted. Neither privations, fatigue, nor the inclemency of the Arctic winters retarded his exertions, which have been peculiarly marked by the extent of the collections of specimens which have been received from, or brought home by, him. Though the value of notes and descriptions of natural objects, made carefully on the spot in distant countries is great, yet the confirmation of their correctness by a comparison with actual specimens, is so much more beneficial, that the highest acknowledgments are due to those who afford such additional aids to science, and in this important point, Dr. Richardson's labours have been eminently successful.

QUADRUPEDS.

NOTWITHSTANDING the long and intimate intercourse which has subsisted between Europe and the northern parts of the New World, our scientific knowledge of the Quadrupeds found in the latter has hitherto been very limited. It might have been expected, that the great demand for the furs of North America, would have originated some careful inquiries respecting the animals from which they were obtained; little, however, has hitherto resulted either from the observations of travellers, or of those persons who have been successively engaged in the traffic in skins. The most useful descriptions which have appeared were those of Forster, published in the *Philosophical Transactions*, from a collection of specimens sent from Hudson's Bay to the Royal Society in 1771, by Mr. Graham: Hearne added to his account of his

journey, some notices relative to the Zoology of Hudson's Bay: these, and the information collected by Pennant in his *Arctic Zoology*, are the only general authorities on the subject.

The descriptions of the present collections with the notices of these animals, specimens of which it would have been impossible, on account of their size, to have procured and brought home, will include all the important quadrupeds of the northern part of the American continent. It will introduce some novelties to the notice of the Zoologist; rectify several points respecting species hitherto imperfectly known, or erroneously placed; and will add some information as to others, whose specific names and characters have been already correctly established.

As the specimens of most of the animals which supply the furs imported by the Hudson's Bay Company formed part of the collection, it appeared very desirable that these should be referred to and compared with samples of the skins imported. A request was accordingly addressed to the Governor and Committee, for permission to have the temporary use of a collection of these skins for such purpose, which was promptly and obligingly complied with: in consequence, there will be found, under the different subjects described, some notice of every kind of skin which is usually imported by the company.

The arrangement of Cuvier, as well as the generic names used by him in the *Règne Animal*, have been adopted and followed in every instance in the account of the Quadrupeds.

Ursus Maritimus, Polar Bear,

Was met with on the shores of Hudson's Bay. It is distinguished from other species of the same genus, by its superior size, its smaller head and elongated neck, its thick and powerful limbs, and its uniform yellowish-white colour. It is rarely and only accidentally seen inland, as it supports itself by preying on animals which live in the sea or on the shores; it appears to pass a great portion of its existence in the water, reposing occasionally on land, but more frequently on the ice.

Ursus Americanus. Black Bear.

This is the Common Bear of America, and has been distinguished and separated by Pallas, from the European Bear, (Ursus Arctos,) from which it differs in several points, and especially in having a greater number of teeth; individuals vary in colour from black to different shades of brown, and are known to the traders under the different names of Black, Brown, Cinnamon, and Grey Bears. They live chiefly on fruits and vegetables, and their flesh is much esteemed as food. The Hudson's Bay Company imported, in 1822, near 3000 skins of these animals. They are met with over the whole country through which the Expedition passed, and even far to the

northward, two having been killed by the party on the shores of the Arctic Sea. The first was an old male, much out of condition and apparently in bad health; it measured five feet eight inches long, exclusive of the tail, which was six inches; its height to the tip of the fore shoulders was two feet nine inches; hair yellowish brown, a little hoary on the back and head, long and somewhat woolly, it was falling off and discovering a very thin sleek black coat underneath. The other was a female and proved very fat; the head of this was smaller than that of the male, and its forehead was almost flat, the other being slightly convex; some differences were noted in the teeth of the lower jaws; in the female five molares were observed, only four were discovered in the male, and the space intervening between the canine teeth and the molares, was smaller in the female than in the male.

Ursus Cinereus. Grizzly Bear.

Hunters' skins were seen of the Grizzly Bear. This inhabits the country at the foot of the Rocky Mountains, and is decidedly different in its habits, manners, and appearance, from the Common Bear; it has not the power of climbing trees, which the Black and Polar Bears, (according to the information given to Dr. Richardson by the natives) do with facility. It is to be remarked, however, that the traders in their common discourse often confound the Cinnamon Bear, or lighter variety of the Black Bear, with the Grizzly Bear, terming them indiscriminately Les Ours Blancs. This animal has been brought into notice by the American travellers, who have visited the countries west of the Mississippi. Lewis and Clarke met with it in the Missouri country, and called it the White-brown or Grizzly Bear: it has been named Ursus Cinereus, by M. Desmerest. It is a beast of wonderful strength and great ferocity. In the introductory discourse of Mr. De-Witt Clinton, printed in the *Transactions of the Literary and Philosophical Society of New York*, some further particulars are communicated relative to it; and a full specific description of it, under the name of Ursus Horribilis, has been recently published in the account of *Major Long's Expedition to the Rocky Mountains.*

Procyon Lotor. Racoon.

The Racoon does not appear to have been met with by the travellers, its natural abode being to the southward of their route: it is introduced here because a small number of its skins is annually imported by the Hudson's Bay Company, and it is desirable that all the animals whose skins are thus introduced should be noticed.

Meles Labradoria. American Badger.

The specimen received of this animal may be considered to settle the disputed question amongst naturalists, in separating the American from the European Badger.

Pennant, in his *Arctic Zoology*, believed them to be identical, but in the *History of Quadrupeds*, they are treated of as varieties of the same species; in this also Buffon agreed, describing the American animal under the name of Carcajou. They were first considered as distinct by Schreiber, whose opinion was adopted by Gmelin. In Buffon's account of the animal, it is represented as having four toes only on its fore feet, whence originated the erroneous specific character given by Gmelin of "Palmis tetradactylis." The descriptions of the several authors are very incorrect. The best method of making the American Badger more properly known as a separate species, will be by an enumeration of the differences between the two.

The American Badger is generally less in size and of lighter make; the head, though equally long, is not so sharp towards the nose, and the markings are remarkably different; a narrow white line runs from between the eyes towards the back, the rest of the upper part of the head is brown, the throat and whole under jaw are white, the cheeks are partly so; a semicircular brown spot is placed between the light part of the cheeks and the ears; the white marking extends in a triangular form a little above the eyes, and below the eyes in a line towards the fore part of the mouth, but the whole eye lies within the dark colour of the upper part of the head, which colour runs with a sharp angle at the corner of the eye into the white. The European Badger has three broad white marks; one on the top of the head and one on each side, and between them are two broad black lines which include the eyes and ears; and the whole under parts of the throat and jaw are black. The upper parts of the body and sides in the American animal are covered with rather long fine greyish hairs, which in the other are darker, coarser and longer; the under parts in the former are lighter than the upper, in the latter they are darker; the legs in the first are dark brown and in the other quite black; and though the animal is of larger size generally, its nails, which are dark, are smaller than the light horn-coloured nails of the American species, and finally, the tail of the European Badger is longer than that of the American. The specimen received measures two feet five inches in length, including the tail, which is three inches long. The animal is abundant in parts of the interior of North America, inhabiting holes in the earth, and having similar habits to its European congener.

A few skins of it are annually imported from Hudson's Bay.

Gulo Luscus. Wolverene.

The Wolverene, or Quick-Hatch, is a general inhabitant of the northern parts of America, as far as the Arctic Sea, and from a skull found in Melville Island, appears to extend its visits beyond the continent towards the pole. Its skin is an object of trade, and forms part of the annual consignments from Hudson's Bay. The animal is well known to naturalists, who first became acquainted with it from the figure and description of Edwards. Two specimens were sent home by the Expedition; one

being much darker than the other, the band of lighter hairs which passes along the sides and on the back of the animal near its tail, being very obscure; the other specimen, in which this marking is distinct, accords with the skin received from the Hudson's Bay Company.

Mustela Martes. Pine Marten.

The Pine Marten is every where abundant in the pine forests. Numbers of the skins (in the last year near 90,000) are annually imported by the Hudson's Bay Company, the fur being held in much estimation. The animal is sufficiently described by all the writers on Natural History, being distinguished by the yellow or orange colour of its throat from the Common Marten, (Mustela Foina) which is marked similarly with white. The Common Marten inhabits the more temperate parts of Europe, whilst the Pine Marten is confined to the northern regions, though it is equally found in Europe and Asia as well as America. The two animals are very similar, and it may be reasonably doubted whether they be not the same species. Considerable difference is observable in the sizes of the two sexes of the Pine Marten, the male being largest by full one third. The winter state of the animal is that in which it is most known both to naturalists and traders; in the summer, in common with the other quadrupeds of Hudson's Bay, it loses the delicate fineness and brilliancy of its fur, which becomes generally paler, especially about the head, and the yellow marks on the throat ceasing to be distinct from the rest of the body, become a dingy white, running into and blended with the lighter brown of the neighbouring parts.

Mustela Pennanti. Fisher.

Strange confusion has existed both as to the name and habits of the Fisher. It is said by Pennant, to be called Wejack; Hearne notices the animal of that name and the Shunk together, rather confusedly. Gmelin referred the Fisher of Pennant, the first writer by whom it was described, to the Sable, (Mustela Zibellina) from which it is distinguished, however, by its longer tapering tail, and by having its chin equally dark with the rest of its body, neither white nor cinereous. Erxleben called it M. Pennanti, and as this was its first specific appellation, it ought to be adopted generally, in preference to M. Piscator, which though corresponding with its English name, is not appropriate, since it does not feed on fish, but pursues the same prey as the Pine Marten. The following description is from two specimens, one sent home by Captain Franklin, the other belonging to the Hudson's Bay Company; both are imperfect, the former being without feet, and the latter, like all hunter's skins, mutilated in the legs and face. Length varying from twenty-four to thirty inches, exclusive of the tail, which is from thirteen to fifteen inches long. The nose is sharp, and the fur near it brown; the whole of the fur on the upper part of the

body is dark at the base, yellowish above, and tipped with black, short on the head and gradually lengthening towards the tail where it loses much of the yellow hue, taking a chestnut colour instead ; the tail is black and shining, the throat brown, with a few white tipped hairs, the belly and legs dark brown ; the ears are short, broad, and round, appearing lighter on the tips. Captain Franklin's specimen was killed at Cumberland-House, in November 1819, but the animal was seen at various places during the Expedition, even as far to the northward as the Great Slave Lake. Fishers are killed by the fur hunters, and purchased by the Hudson's Bay Company, whose importation in the last year amounted to 1800.

Mustela Lutreola. Mink.

No specimen of this animal was sent home, although it was met with by the travellers on their journey, and a drawing of one was made by Lieutenant Hood ; a skin was received, with those supplied by the Hudson's Bay Company for the purpose of elucidating these notices, and as the name " Mink," has been applied by some writers to other animals than the present, it is very satisfactory that the authority of its application here is unquestionable. The Mink is well described by Forster, in the *Philosophical Transactions*, in his account of the animals received in 1771, from Hudson's Bay, as the Lesser Otter, or Jackash, as it is called by the natives ; it is considered by him to be the same as M. Lutreola, which is found in parts of Europe and Asia. Hearne also notices it. It is of slender make, with more of the general appearance of a small Otter than of a Marten. The fur, apparently of excellent quality, is short and thick, of an uniform dark brown, glossy at the tip, that of the tail rather longer and darker. The specimen, including the tail, which is six inches long, is nearly two feet in length. The number of skins of this species, imported by the Hudson's Bay Company in 1822, exceeded 4600. The habits and prey of the Mink are those which have been erroneously ascribed to the Fisher, and it is probable that the Mustela which feeds on fish, mentioned in the communications from the northern parts of America, is really the animal now described : it is a true Fisher, haunting small streams and rapids in the summer, and preying upon the fish that come there to spawn.

Mustela Erminea. Stoat Ermine.

An universal inhabitant of the northern countries, both in the Old and New World. It is known as the Stoat in the summer season, when the whole upper parts of the body are brown ; in the winter it becomes beautifully white, with the exception of the tip of its tail, which is black. It has not been observed by writers that the fur of the Ermine becomes thicker and elongated in winter, but this is a general effect of cold in all Quadrupeds, whether they alter the colour of their coats or remain unchanged. In the vicinity of Hudson's Bay and in the interior, the Ermine frequents the houses

of the settlers in search of mice, which constitute its principal food. The skins, though elsewhere an article of commerce, do not appear to have been imported in the last year by the Hudson's Bay Company.

Mephitis Americana. Skunk.

These animals corresponding in general character and appearance, but with great diversity of the arrangement of their white and black markings, are found in all parts of the New World. Several of these, heretofore separated, have recently been considered by M. Cuvier as referable to one species, and the whole have been removed by him from Viverra, where they have hitherto been arranged, and made a distant genus. The animals, now under examination, are the particular sort designated as the Viverra Mephitis of Gmelin, the Skunk of Pennant and Hearne, and Le Chiche of Buffon. They are well known on account of the intolerably disagreeable odour which they emit when irritated, whence they obtained, amongst the French settlers in North America, the name of Bête puante and Enfant de diable. Two specimens were received from the Expedition, they were only seen in the first period of the journey, for though the animal is frequent in the places which it inhabits, it was not found north of the Slave Lake. The specimens differ slightly, one having rather broader stripes of white than the other, the variations in this particular have heretofore been considered to constitute distinct species.

Lutra Canadensis. American Otter.

The Otter of America has hitherto been identified with that of Europe, from which it was considered to differ in size only; but independent of that circumstance, there appear to be other points which will support its separation from the European Otter, and the specimen supplied by Captain Franklin being quite perfect, a complete comparison of the two animals can be now instituted. The chin and throat are dusky white and all the rest of the body is a glossy brown, finer and thicker than that of the European Otter. The neck is elongated, not short, and the head narrow and long, in comparison with the short broad visage of the other animal; the ears are consequently much closer together. The tail is more pointed and shorter, being considerably *less* than one half of the length of the body, whilst the tail of the European Otter is *more* than half the length of its body. These differences are probably decisive as to their specific difference. The whole animal is five feet long, of which the tail is eighteen inches. A fine specimen of the European Otter measures forty inches including its tail, which is fourteen. The American Otter is an inhabitant of the waters of the whole northern parts of America, and is found as far north as the Copper-Mine River. The skins are articles of considerable commerce, the imports of last year from Hudson's Bay having amounted to 7300. M. Cuvier unites the Lutra Brasiliensis of

Gmelin with the North American Otter, probably correctly, though that animal has usually been considered only an inhabitant of the warmer parts of the New Continent.

Canis Lupus. Wolf.

There is so much diversity, both in the size and colour of the Wolves found in the interior of North America, that it is but reasonable to doubt, whether some may not belong to species distinct from that which is well known as the Common Wolf, Canis Lupus, of the northern portion of the globe; the usual colour of which is reddish brown varying occasionally to black. Besides the two animals which fell into the hands of the Expedition, and which will be successively particularly noticed, Dr. Richardson mentions a Wolf smaller than the Fox, which was not uncommon in the plains in the southern parts of the country visited by Captain Franklin; and neither of these accord with the Wolves seen at Melville Island, and which are much smaller than the White Wolf taken by Captain Franklin's party at Fort Enterprise. Thus we appear to have knowledge of four kinds, all to be met within the districts visited by the Expedition. During the stay of the travellers at Cumberland-House in the first winter of the journey, very satisfactory information was obtained, confirming the observations made during Captain Parry's residence on Melville Island, of the readiness which Wolves shewed to have intercourse with domestic Dogs. This circumstance was fully known to the settlers, as well as that the produce of such intercourse possessed all the character of perfect animals, and was not considered as the production of two species. If such confirmation of what was before known had been required, the present information would fully establish the point of the specific identity of the Wolf and Dog, and does away the possibility of specific differences between the kind of Wolves, which thus are known to connect themselves with the domestic Dogs. A few skins of Wolves are annually included in the importation of the Hudson's Bay Company.

Canis Lupus—Griseus. Grey Wolf.

Grey Wolves are common in the neighbourhood of Cumberland-House, a magnificent specimen of one was caught in a trap, during the residence of the Expedition at that place in January 1820. The skin was preserved and reached England safe. It is very dissimilar in colour to the usual state of the Wolf, and is of much greater size. Its dimensions are as follows: length to the setting on of the tail, four feet; tail fourteen inches; height to the top of the shoulders two feet. The teeth are remarkably strong and large; the ears sharp and erect, thickly clothed with dark-brown hair tipped with grey; above and below on the neck, the hair is thick and bushy; the whole of the body is covered with a mixture of long, grey, and thick hairs, having some few white ones intermixed on the back; the sides and belly are dark grey; the

tail is bushy, grey tipped with brown ; the legs are strong, covered with dark-brown hair ; nails of both fore and back feet strong, short, and arched.

Canis Lupus—Albus. White Wolf.

However great the dimensions of the preceding animal may appear, they are surpassed by that of a Wolf entirely white, which was killed at Fort Enterprise during the second winter that the Expedition remained in the interior. A plate of it has been engraved to accompany the narrative. Its length was four feet four inches, its height two feet ten inches, and the length of the tail was nineteen inches. The specimen was preserved, but proving too bulky was left behind. It was previously known that white Wolves existed in the vicinity of the Arctic Seas, and it is probable that the loss of colour is effected by the severity of the winter season ; though this change does not appear to occur in all cases, because the Wolves, seen at Melville Island during the winter of 1819-20, though lighter than usual, were not white, nor were they of such large size as that killed at Fort Enterprise.

Canis Vulpes. Fox.

Foxes are met with over the whole wooded part of the country. The different kinds, which are well known to and distinguished by the huntsmen, are all objects of commerce, above 8000 skins having been imported by the Hudson's Bay Company in 1822. The different Foxes (with the exception of the Arctic) which have been known to exist in the northern parts of North America, have until lately been referred by naturalists to the species at the head of this article, and were considered as varieties of it : the same opinion seems to have existed amongst the inhabitants of that country, for both the Indians as well as European Americans have traditions that they originated from Europe. The former suppose them to have passed from the Old World over the Arctic ice ; the latter, that they were imported for the purpose of affording amusement to hunters. The former opinion is correct, so far, as that the same animals appear to be found in the northern parts of Europe and Asia ; but it is more probable that the whole of the Arctic regions may be considered as their natural *habitat*, than that any one portion of it has supplied the others with the animal. The opinion of the specific identity with the common European Fox (Canis Vulpes) appears now with propriety to be abandoned ; whether there are sufficient grounds to separate the whole from each other may be doubted, but as they have all been lately described as distinct species by M. Desmerest, his arrangement has been adopted, as affording more perspicuity in the elucidation of their differences. The skins of these animals, received by the Hudson's Bay Company, are well known in trade as those of the *red*, *cross*, *silver*, *blue*, *kitt*, and *white* foxes ; and the animals from whence these are obtained, all, in some degree, fell under the observation of the Expedition.

Canis Fulvus. Red Fox.

The Red Fox is the most frequently met with, and approaches nearest to the European though differing much from it. It is of slighter make and taller on the legs; the visage is long and sharp; the ears erect and pointed, their outside black, and inside white; its general colour is bright ferruginous on the head, back and sides, but less brilliant towards the tail; under the chin it is white; the throat and neck dark grey; and this colour is continued along the first part of the belly in a stripe of less width than on the breast; the under parts towards the tail are very pale red; the fronts of the fore legs and the feet are black, and the fronts of the lower parts of the hind legs are also black; the tail is very bushy, but less ferruginous than the body, the hairs mostly terminated with black, and more so towards the extremity than near the root, giving the whole a dark appearance; a few of the hairs at the end are lighter, but it is not tipped with white. The above description of the colour of the body and tail is from a skin belonging to the Hudson's Bay Company, which may be considered as in its best state; in the specimen sent home by the Expedition, and which was probably killed in the latter part of the winter, the fur on the body is longer, and has lost all its brilliancy of colour; the whole appears to be in preparation for change, the upper parts of the legs having already lost the long hairs and exhibiting a short red coat, which is of course only beginning to grow. The fur of the skin which has been described is long, though not so extended as in the winter specimen; from the appearance of which it may be concluded, that the animal, when it loses its winter covering, does not, till after some interval, obtain the length of fur which is requisite to the skin in a commercial view. The specimen, having been set up, stands eighteen inches high; it is near two feet in length, and the tail measures sixteen inches.

Canis Decussatus. Cross Fox.

The specimen received from Captain Franklin and that from the Hudson's Bay Company, nearly correspond; the colours of the latter are rather more brlliant and darker; it also appears to have been taken from a somewhat larger animal. The Cross Fox, in comparison with the Red, is shorter on its legs, and has a larger and longer body, being altogether a stronger animal. The front of the head is grey, composed of black and white hairs, the latter predominating on the forehead; the ears are large, covered with short soft black fur behind, and within with long yellowish hairs; the back of the neck and shoulders are pale ferruginous, crossed with dark stripes, one extending from the head to the back, the other passing the first at right angles over the shoulders; the rest of the back is grey composed of black fur tipped with white; the sides are pale ferruginous, running into the grey of the back; the chin and all the under parts, as well as the legs are black, a few of the hairs being tipped

with white; the bottom of the feet are white; the under part of the tail, and the parts of the body adjacent, are pale yellow; the grey character of the back extends to the upper part of the tail, at the commencement; the rest of the tail is dark above, and lighter beneath, being tipped with white. The character of the fur is thick and long. The specimen, when set up, will stand about fourteen inches high; it is two feet four inches in length, and the tail, which is thick and bushy, is sixteen inches long. The colours of the coat of the Cross Foxes are said to vary considerably; in some the red preponderates, so much as to approach the Red Fox, and then to be mistaken for it, in others so much dark fur prevails, that they resemble the Silver Fox. Without specimens in these different states, it is impossible to arrive at certainty on the subjeet, but the circumstance induces a doubt whether these three kinds are specifically distinct.

Canis Argentatus. Black or Silver Fox.

Captain Franklin's specimen was obtained from a hunter, and has, consequently, undergone the usual mutilation. The skin from the Hudson's Bay Company is in a better condition, and will therefore be the one described. The animal is smaller than either of the preceding, about two feet long, and probably of inferior stature; the tail is fourteen inches long. The head is short, with strong black whiskers; the fore part dark grey, having short black hairs tipped with white; the ears are narrow and pointed, black both within and without; the back of the neck and shoulders quite black, and a black line extends along the back; the rest of the back is silvery grey; the whole under-part and sides are black, the chin and breast darkest; the legs are also black; the tail is black, with a conspicuous white tip. The fur is soft, but not long; the tail is less bushy than that of the Foxes before described. The skins of the Black Foxes are especially valuable, and the animals are of rare occurrence; they are sometimes obtained entirely black, without any silvery markings.

Canis Virginianus. Grey Fox.

This animal lives in the parts of America more to the southward than those visited by the travellers, and was not met with alive; but its skin was seen in the hands of the traders. This notice of it is therefore given from a skin belonging to the Hudson's Bay Company, by whom they are imported under the name of Blue Foxes. The animal is about twenty-nine inches long, its tail not exceeding nine inches, in addition to the length of the body. The fur, in colour, is nearly uniform over the whole animal, loose and long, next the body pale lead colour, and tipped with brown; the tail is very thick and bushy, and differs in having a very slight rufous tinge, which is not perceptible, on any other part of the animal.

Canis Cinereo-argenteus. Grizzled Fox.

A hunter's specimen of this pretty quadruped was obtained at Carlton-House. It is common on the sandy plains between the north and south branches of the Saskatchawan. The skins of this species are imported by the Hudson's Bay Company, under the name of Kitt Foxes. It is the smallest kind which inhabits North America, and though not unknown to naturalists, is but very imperfectly described. Its Latin specific name was applied by Gmelin. Dr. Shaw has called it the Fulvous-necked Fox, but the name is so inapplicable as to render a new English appellation absolutely necessary. It is the Prairie Dog of the French settlers in America. The length of the head and body is about twenty-four, and of the tail, eleven inches. The upper parts of the head are grizzled, consisting of white, brown, and fulvous hairs; over the shoulders, on the back and sides, towards the tail, the fur is short and grizzled, having black and whitish hairs intermixed; the sides next the shoulders have longer fur, which is ferruginous; the throat and belly are white; the tail is thick and bushy, the fur of the upper side is pale, slightly tipped with black, the under part is ferruginous, and the end entirely black. It is not impossible that the animal described in the *History of Quadrupeds*, which was received by Mr. Brooks, from Pennsylvania, under the name of Brant Fox, and referred by Pennant to the animal of that name, described by Gesner and Linnæus, may belong to this species; in size, it accords, but the colours do not exactly agree with that of the present specimen.

Canis Lagopus. Arctic Fox.

The Arctic Foxes were found breeding at Point Turnagain on the Arctic Sea, they generally continue on the sea-coast, and seldom visit the interior except in severe winters; a few breed near York Factory. They were seen by the Expedition under Captain Parry, on all the North Georgian Islands, where they remain during the winter. The animal is the Isatis of Buffon, and, in its summer coat, has been erroneously called the Blue Fox. In its winter state, it is the White Fox of commerce. Specimens were brought home of the animal, as it is found in both seasons; the White Foxes are so well known, that a description of them is unnecessary, but naturalists are less acquainted with the species in its summer state; when the specimens are together, a person unacquainted with the circumstance, would, with difficulty, be persuaded to believe them to belong to the same animal; the abundance and length of the winter coat gives it a very enlarged appearance, whilst, on the contrary, the short condition of its summer fur, causes it to seem peculiarly small. In this state, the head and the chin are brown, having some fine white hairs scattered through the fur; the ears, externally, are covered like the head, within they are white; a similar brown colour extends along the back to the tail, and from the back is continued down the outsides of all the legs,

but on the latter, a few white hairs are intermixed; the whole under-parts, and the insides of the legs, are a dingy white; the tail is brownish above, becoming whiter at the end, and is entirely white beneath.

Felis Canadensis. Canadian Lynx.

A very fine specimen of this beautiful but rapacious animal, which is usually called in the British settlements and amongst the hunters of America, the Wild Cat, was sent from Cumberland-House, It is a timid animal, offers little resistance when attacked, and is easily despatched by a blow on the back. The remarkable points of its character are, its sharp ears, tipped with a tuft of black hair; long bunches of hair on each side at the back of its under jaw; its thick and furry legs and feet, and its short tail tipped with black. The specimen stands about sixteen inches high, and measures three feet from the top of its nose to the end of the tail, which latter is only four inches long; the mass of hair on its back and sides is short and thick, that on the back is dark below tipped with white, on the sides reddish below and tipped also with white, the whole having a reddish grey mottled appearance, but not spotted; the hair of the belly is light and long; that of the head is grey, as on the back, but shorter; the head is thick and short, the eyes placed forward, whiskers white and turned back; nails white, short, and sharp, slightly curved. M. Geoffrey St. Hilare separated this animal from the European Lynx, considering it a distinct species. The skins, which are imported from America, make a beautiful fur, and are in high estimation, near nine thousand being the amount imported last year by the Hudson's Bay Company. The flesh is good as food, it is white, and has some resemblance to a rabbit in flavour. It preys chiefly on the common Hares (*Lepus Americanus*) of the country.

Castor Fiber. Beaver.

Beavers are found to the northward as far as the wooded countries extend, but there were none in the Barren Grounds to the eastward of the Copper-Mine River. The import of Beaver skins last year by the Hudson's Bay Company, amounted to sixty thousand. A black variety is sometimes taken, and is considered a valuable rarity. Dr. Richardson also states that a white variety is of occasional occurrence.

Fiber Zibethicus. Musk Rat.

The Musk Rats, or Musquashes, as they were called, were abundantly found almost during the whole journey, even far north. It is surprising that those industrious animals (whose habits, so similar to those of the Beaver, are well known, and have often been described) do not give way to the annual destruction of their race for the supply of commerce; very nearly 150,000 of the skins were imported last year by the Hudson's

Bay Company, and even more are annually killed and carried into Canada. They destroy each other frequently, and the loss in severe winters from this cause is greater than what arises by the spears of the hunters. They are, however, very prolific. A variety with black fur is occasionally met with.

Fiber Zibethicus—albus. White Musk Rat.

A specimen of a singular variety of the Musk Rat accompanied that just described. It was killed near Cumberland-House, and presented by Mr. Holmes, chief of that station, to the travellers. Except in size and colour of its hair, it differs in no respect from the common Musk Rat; its teeth, which are correspondent to its proportional smaller dimension, are not those of a young animal. The body is eleven inches long only, and the tail six inches. The hair both above and below is an uniform dingy white.

Arvicola Xanthognatha. Hudson's Bay Campagnol.

A mouse, belonging to the division of the Linnæan genus Mus, now separated, and called Arvicola and Campagnol by M. Cuvier, is abundant in the settlements round Hudson's Bay. It shows a strong inclination to domesticate itself, by frequenting the houses. These animals are preyed upon by the Ermine, and form its chief support. They steal fat, and make hoards of it in the manner of the Economic Mouse of Pallas, to which they are allied. Specimens were sent home from Hudson's Bay, but were not found among the collection. The following description has been supplied by Dr. Richardson:—"In general shape and appearance it strongly resembles the European Domestic Mouse; but it is a little larger, and has a broader back. The colour of the fur on the back is light chestnut-brown, with a few black tips to the hairs; the sides are pale yellowish brown, and the belly ash-grey; the fur in winter is long, and when blown aside exhibits a shining blackish-grey colour towards its roots; the ears are large, but having nearly an orbicular form, do not stand high; they are thinly covered with hairs, and have a membranous appearance; the eyes situated about half way between the ear and the tip of the nose, are small; the vibrissæ on the cheek are longer than the head; the upper lip is but slightly cleft, and the nose projects but little beyond the mouth; within the mouth, on each side, is a small orbicular tuft of hairs seated over a collection of glands which lie beneath the cuticle; the tail is round and hairy, about one inch long, its upper surface corresponds in colour with the back, its under one with the belly; the posterior extremities are longer than the anterior ones, but the difference is not remarkable; the broadness and fleshiness of the body almost conceal the legs; there are five toes on the hind-foot, the three middle ones are nearly equal in length, the extreme arises higher up; the nails are curved, pointed, and canaliculate below, and each of them is inserted into the callous tuberculated extremity of the toe; there are six similar tubercles on the sole,

disposed by threes; the toes are hairy above, and the hairs project beyond the nails, underneath they are naked like the soles, and each is divided by five or six transverse grooves into as many dark callous ridges; the fore-feet want the thumb, but in nails and all other respects are like the hind ones, being however a little smaller and more slender." The animal, now under consideration, seems nearly to correspond with the short account of a Campagnol received from Hudson's Bay by Mr. Bullock, and described and figured by Dr. Leach, in the *Zoological Miscellany*, under the name of Avicola Xanthognatha; but the description of it in that work is scarcely sufficient for identification.

Lemmus Hudsonius. Hudson's Bay Lemming.

These Lemmings are spread over the whole country of North America, and extend themselves even to the islands of the Polar Sea, in which they were found abundantly, by the Expedition under Captain Parry, and have been described by Captain Sabine, in his account of the Zoology observed in that voyage. They vary much in size, some approaching that of a rat, the females are always the smallest. In winter their coat undergoes a change to a dingy white, in summer it is dark grey, with more or less of ferruginous on the sides. Hearne calls it the Hair-tailed Mouse. The middle toes of the fore feet, in this species, are remarkable in having a callus beneath the claw, projecting below it. It is the Mus Hudsonius of Pallas, and is an animal so well known to naturalists, as to render a more detailed description of it unnecessary.

Mus Labradorius. Labrador Mouse.

This animal which is noticed by Pennant, has escaped the observation of most other naturalists, and is now described from a specimen sent home from Cumberland House. In the length of its hind legs it differs from others of the genus Mus, with which notwithstanding it seems proper to arrange it. The body is near four inches long; the forehead arched and projecting, so as to turn the nose towards the earth; mouth placed far below, small, and with the upper lip slit; ears large, round, and placed far back; whiskers long, black and projecting, forming two tufts; whole upper part dark brown, under parts white without a dividing line; hind legs one inch and a half long, covered with short hair, having five toes, four long ones and one shorter placed on the inside; fore feet short, with four toes; tail two inches and a half long, with dark hair above, and white below, shewing the joints of the bone.

ARCTOMYS.

In the collection which arrived at the end of the year 1820, from Captain Franklin, specimens of three new species of this genus were received. An account of them with figures of each was presented to the Linnæan Society, and subsequently published in the thirteenth volume of its Transactions, to which a reference for the specific characters and detailed descriptions may be made. We are very imperfectly acquainted with the other species of this genus, which are natives of America, although described in the publications of naturalists; and there is good reason to expect that several other undescribed Marmots are still to be found in the plains of that extended country. The Marmots are generally called Ground Squirrels, by the inhabitants of the districts where they are native.

Arctomys Empetra. Quebec Marmot.

A hunter's skin only of this animal was received, but is a very interesting specimen, because it exactly agrees with that described by Forster in the *Philosophical Transactions* in 1772, except that it is about two inches longer in the body and with somewhat a longer tail. The accounts of all the writers, who have mentioned the Quebec Marmot, vary much from each other, and it is probable that more than one species will be found to be at present ranged under the head of Arctomys Empetra. Four different specimens have been noticed and examined by naturalists. The first, by Pennant, was a living animal; the second, by Forster as above mentioned; the third, by Pallas, from a specimen in the Leyden Museum, and the last in the paper on the genus in the thirteenth Volume of the *Transactions of the Linnæan Society*, from a specimen presented to the British Museum by the Hudson's Bay Company.

Arctomys Franklinii. Grey American Marmot.

This animal, rather larger than a rat, was obtained in the neighbourhood of Cumberland-House, and was afterwards seen at Fort Enterprise. Its general colours are dark variegated yellowish grey on the upper parts, and dingy white below; the tail is four inches long, banded with black and white, appearing indistinctly striped. The name was given to the specimen in compliment to the commander of the Expedition.

Arctomys Richardsonii. Tawny American Marmot.

This animal is somewhat smaller than the preceding, and more slender, tawny light brown above, and pale underneath, with a tail three inches and a half long thickly covered with hairs. The specimen was obtained at Carlton-House, where, like others of its genus, it inhabited holes in the ground; it was subsequently found

even on the shores of the Arctic Sea. The specific name is a tribute to the exertions and to the success of Dr. Richardson.

Arctomys Hoodii. Striped American Marmot.

The beauty of this elegant and interesting little animal can be but indifferently understood by description: it is only seven inches and a half long; the upper part of the body is marked with numerous longitudinal stripes of brown and dingy white; the brown stripes are dotted the whole length with little spots of light colour, the same as that of the paler alternate lines; the under parts of the body are pale brown. It was observed living like its congener, in holes in the ground, in the level country round Carlton-House.

When the specific name of Hoodii was attached to this animal, the untimely fate of the deserving individual, in compliment to whom it was named, was unknown in England: it may be, therefore, permitted now to observe on the part of Natural History, that his many careful and accurate drawings of subjects connected therewith, bear ample testimony to the loss which that science, in common with his country and his immediate profession, have sustained by the premature termination of his life.

Sciurus Hudsonius. Hudson's Bay Squirrel.

Both Forster and Hearne, in their notices of this animal, appear to have taken it for the common European squirrel, whereas its native country is solely that in the vicinity, and westward of, Hudson's Bay. Two specimens were received, a male and female, which had been caught at Cumberland-House, in October, 1819. The following description is taken from the male:—length two inches; whole upper parts brownish grey, with a slight ferruginous tinge on the back and head, but not on the sides. The speckling is formed by very minute markings on the hair, and is very beautiful: under parts entirely cinereous grey; the tail is six inches long, the hair longer than that of the body; the upper part ferruginous grey, brighter than the back, and tipped with black; the under part, which is shewn when the tail is set up, is darker than elsewhere, there being more of black mixed with the ferruginous grey hairs. Though a constant inhabitant of the northern continent, it does not change the colour of its coat in winter. The tail is erroneously said by Pennant to be barred with black; it is not so. These animals inhabit the Pine forests, and are found wherever the White Spruce Fir grows, living upon its seeds, and passing the winter in holes at the roots of trees, coming out occasionally for food, and to sport in fine weather among the branches. The flesh of the females is good; that of the males tastes strong, particularly in the spring season.

Hystrix Dorsata. Canada Porcupine.

This singular and uncouthly-looking animal has been known to naturalists since the time of Edwards; it is not, however, of frequent occurrence, which may be partly caused by its increasing slowly by breeding, (for they are said to produce only a single young one at a birth), and partly by the facility with which they are discovered and taken by the Indians; for their flesh being esteemed a delicacy, they are eagerly sought after. The Porcupine is found as far north as the forks of Mackenzie's River, almost exclusively in woods, consisting of the Pinus Banksiana, upon the bark of which it lives. It is much troubled with intestinal worms of a large size. It is well described by Pennant, as well as noticed by Forster and Hearne. It appears to be a stupid, inoffensive animal, scarcely capable of protecting itself against any attack, the arms with which nature has furnished it being very weak defences against any force.

Lepus Glacialis. Polar Hare.

Was long confounded with the Alpine Hare, (Lepus Variabilis), a specimen which was brought home by the first Arctic Expedition was noted as a new species by Dr. Leach, in the published account of that voyage. Captain Sabine, who found them plentifully at Melville Island, has fully elucidated the difference between the two species, in his *Zoological Appendix* to Captain Parry's last voyage. There are three known species of Lepus, which uniformly put on a new covering of white fur in the winter, the two above mentioned, and the American Hare, which is the subject of the next article. The Polar Hare appears to vary much in size, and consequently in weight; this perhaps may be caused by the quantity and quality of the food it can command. Dr. Richardson observed that the Polar Hare is never seen in woods, it frequents the Barren Grounds, living chiefly on the berries of the Arbutus Alpina, and the bark of Dwarf Birch. It sits like the Common Hare, on the whole length of the tarsal bones, but in running its hind feet make a round print in the snow, similar to that made by the fore ones.

Lepus Americanus. American Hare.

These animals, which are generally called Rabbits about Hudson's Bay, extend themselves over the whole of America, and are much used as food; their flesh is brown, like that of the Common Hare. They are not found more northward than Carlton House, and they retire from thence southwards in the winter season; those which are exposed to the severity of cold, put forth a clothing of fur double the length of their summer dress, the lower part of which is brown, then red, and the entire upper part

is a beautiful soft white fur, which makes the skin of the animal in that state an object of commerce; near 10,000 of these were imported from Hudson's Bay, last season. The animal is very rarely sent to England in its summer state, from these northern regions, but a specimen was received from Dr. Richardson, from Cumberland House, in the spring of 1820, of which the following is a description: —length, one foot four inches; hind legs, ten inches long; head, narrow, dark above, lighter brown on the sides, and ash-coloured below; ears wide, edged with white, on back and tips brown; back very dark; sides inclining to ash colour; inside part of the neck slightly ferruginous; belly white; tail small, dark above, white below, the under part turned up; legs having a greater quantity of white hairs than dark ones; nails on hind and fore feet, sharp-pointed, narrow and nearly straight. Has much greater resemblance, both in size and colour, to the Common Rabbit, than to the Common Hare, but its long hind legs differ from those of the Common Rabbit.

CERVUS. STAG AND DEER.

The various Cervi, which are found in North America, are at present very inaccurately known; the information acquired by the Expedition, has added to the stock of knowledge, respecting them, yet not sufficiently to enable us at present to place them under distinct names, with positive reference to separate species. An enumeration of all the different kinds mentioned by writers or travellers, will probably contribute to the attainment of greater certainty respecting them hereafter. *First*, the Moose Deer of the English settlers, the Orignal of the French Americans, and the Black Moose of the United States, has been correctly referred ot the Cervus Alces, the Elk of Europe; it, however, is not the animal which is commonly called the American Elk but it is the Flat-horned Elk, of some Trans-atlantic writers, and is called Mongsöa by the Cree Indians. *Second*, the Rein-deer, (Cervus Tarandas,) the Caribou of the French settlers. Dr. Richardson thinks there are three varieties of this species: 1st. the Rein-deer of the woods, which confines itself to parts where trees abound. 2nd. A large kind, living on the Rocky Mountains, possibly the Mule Deer of Lewis and Clarke mentioned below. 3rd. A smaller kind, which supports itself on the barren grounds, and migrates in summer to the Islands of the Polar Sea. It is this last animal from which the descriptions of the Rein-deer have usually been made by naturalists; it is known to the Cree nation by the name of Attehk. *Third*, the Stag, or Red-deer of North America, which is also called the Grey Moose, in the United States, has been taken for the Red-deer (Cervus Elephas) of Europe, but that species is smaller in size, and seems not to be native in the new world. Gmelin made the American stag a variety of Cervus Elephas, with the sub-denomination of Canadensis, which has been adopted

by M. Cuvier as a specific name. It has occasionally been called Cervus Major, which appellation it received from Catesby. This deer is called Le Biche by the Canadian voyagers, it is the We-was-keesh of Hearne, and the Wa-was-keeshoo of the Cree Indians. It is also sometimes called by the Americans, the Elk, and is the American Elk of some, and the Round-horned Elk of others, of their writers. *Fourth*, the Wapiti Deer, (Cervus Wapiti,) come from the Rocky Mountains, and the valleys adjoining, but not from the eastern side of that ridge; they are inhabitants of mountainous districts, not living either in the plains or in woods; and abound on the Multnomah fork of the Columbia River. The Wapiti have within these few years become well known in England, having been imported at different times for exhibition. Some of those first introduced have been domesticated, they have succeeded well in the paddock of the proprietor, and increased in number, breeding readily. It has been supposed that the Red-deer of the northern parts of America, and the Wapiti are identical, but this opinion certainly requires confirmation. The appellation of Wapiti is derived from a tribe of Indians, who inhabit the western side of the Rocky Mountains, but were erroneously supposed to be settled on the Missouri. All the other names given to the Wapiti Deer, have led to much confusion respecting them. Bewick, who figured one at a very early period, called it the American Elk, and even at the present time this same error has been committed by M. Desmerest. Mr. Ord (and, after him, M. Desmerest) called the animal Cervus Major, which has been before applied by Catesby, to what has been above noticed as Cervus Canadensis. *Fifth*, a deer hitherto imperfectly known, has been recently distinguished in the account of Major Long's Expedition to the Rocky Mountains; it is the Black-tailed Deer of Lewis and Clarke, and has been called Cervus Macrotis by Mr. Say, who accompanied Major Long as a naturalist. *Sixth*, a Deer with a large tail, and which is known, in its native country, as the Black-tailed Deer, (Cervus Macrourus,) has been spoken of as inhabiting the countries watered by the Missouri. It is peculiar, from the size and contrasted colours of its tail, which it shews conspicuously in running. *Seventh*, the Cervus Virginianus is well known as the Fallow Deer of North America, but does not extend itself so far as the Arctic Circle; M. Cuvier refers to it the Mazame of the Mexicans, and the Cariacou of Daubenton. *Eighth*, the American Roe of Buffon has been referred to the Cervus Mexicanus of Linnæus, which is also conjectured by Pennant to be the Squinaton of Dobbs; the Jumping Deer of the Canadian Voyagers is probably the same animal. Dr. Richardson states that in the neighbourhood of Carlton-House, two deer are frequent, which differ much from each other in appearance, that they are indiscriminately called Apeesce-Mongsoos, or, Little Moose; but are occasionally distinguished, as,—1st., The Athee-Neettoo Apeesce-Mongsoos, or, Real Little Moose; and,—2d, Kinwaithoos or Kinwaithoo-wayo Apeesce-Mongsoos, or Long-tailed Little Moose.

From the above sketch, the following may be taken, as the species of Cervus, natives of North America, at present known. 1st., C. Alces, the Moose Deer. 2d., C. Tarandas, the Rein Deer. 3d., C. Canadensis, the American Stag. 4th., C. Wapiti, the Wapiti Deer. 5th., C. Macrotis, the Mule Deer. 6th, C. Macrourus, the Black-tailed Deer. 7th. C. Virginianus, the American Fallow Deer. 8th., C. Mexicanus, the American Roe.

It is probable that all the other names of writers and travellers, whether taken as varieties or species, will be found referable to one of the above; some of the specific names are objectionable, especially that of Canadensis. Much information on the subject of these animals, especially those of the western territories, has been derived from Mr. John Dunn Hunter, a gentleman recently arrived in this country from America, who has passed a great portion of his life among the native inhabitants of the countries west of the Mississippi.

Antelope Furcifer. Prong-horned Antelope.

This animal, which is generally called a Goat by the Canadians, resorts to the neighbourhood of Carlton-House, during the summer, to bring forth its young, and returns to the southward in the winter. The Cree name is Apeestatchœkoos. They go in small herds, and are not shy, approaching near to the persons they meet, through curiosity; their form is elegant, and they are said to be the fleetest quadrupeds on the plains. A male and female were seen, and fortunately killed, so as to enable Dr. Richardson to take the following descriptions. The male is furnished with short black roundish tapering horns, arched inwards, turning towards each other, but with their points directed backwards; each horn having a single short branchlet projecting anteriorily from the middle. The winter coat consists of coarse round hollow hairs, like those of the Moose; neck, back, and legs, yellowish brown; sides reddish white; belly and chest white, with three white bands across the throat, the hairs on the occiput and back of the neck, are long, and tipped with black, they form a short erect mane; there is a black spot behind each cheek, which exhales a strong hircine odour; the tail is short, with a large spot of pure white on the rump. The dimensions were as follows;—from the nose to the root of the tail, four feet; height of the fore shoulder, three feet; that of the hind quarter the same; girth behind the fore legs, three feet; girth before the fore legs, two feet ten inches. The females are like the males, but have no horns; they produce two young at a time.

The head, with the horns, was sent home. A specimen of this animal was obtained in the exploratory travels of Lewis and Clarke, which is deposited in the museum of Mr. Peale, at Philadelphia, from whence a drawing was made by Mr. Hamilton Smith, which has been copied and published, with a description, in the thirteenth volume of the *Transactions of the Linnean Society*; the specimen of that animal mea-

sures twenty inches longer than the one examined by Dr. Richardson, and it appears to have been altogether larger, though not much higher. Mr. Smith, in the same place, has given a figure of a pair of horns, which are preserved in the Museum of the College of Surgeons, in Lincoln's-Inn-Fields, and which he was induced to consider as belonging to a different animal, which he has called Antelope Palmata. The horns sent home by Dr. Richardson, have been compared with those in the College of Surgeons, and found to correspond exactly with them, and confirm Mr. Smith's conjecture that the curvature of the extremities are naturally directed inwards. The acquisition of these is particularly useful, because it authorizes the union of the A. Furcifer, and A. Palmata, of Mr. Smith ; they are evidently but one animal.

This is the only instance of an Antelope not having perfectly simple horns ; and the deviation from that character has suggested the propriety of establishing a new genus in which this animal may be placed, and which has been proposed by Mr. Ord to be named Antelocapra.

Bos Americanus. American Buffalo.

The American Buffalo, or Bison, though separated by Linnæus, has been confounded with the Buffalo of the ancient world. An individual living specimen has, for a few years past, been exhibited, under this mistake, to the inhabitants of the British metropolis, as the Bonassus of Aristotle and Pliny. The Buffaloes are abundant in all parts of North America, wherever the progress of cultivation has not interfered with their range; they are extremely numerous on the plains of the Sashatchawan, and are also found, though less plentifully, in the woods, as far north as Great Slave Lake; a few frequent Slave Point, on the north side of the Lake, but this is the most northern situation in which they were observed by Captain Franklin's party. The natives say that the wood Buffaloes are larger than those of the plains, but the difference is not material; they are called Moostoosh by the Cree Indians.

Bos Moschatus. Musk Ox.

Musk Oxen are only found in the most northern parts; they were not seen farther south than latitude 66° in the line of country examined by the Expedition; but pursuing the course of the shores of Hudson's Bay, they occasionally came in that direction as low as 61°. They support themselves on the same food as the Rein Deer. Their flesh used formerly to be brought to Fort Churchill by the hunters. The late Arctic Voyage of Captain Parry, has brought us more acquainted with the habits of these animals; in summer they migrate in considerable numbers from the continent, over the ice, to the various islands which exist in the Polar Sea. M. Blainville has proposed to place this animal in a new genus, to be named Ovibos. The Crees call the Musk-Ox, Mathek-mongsoo, or Ugly Moose.

BIRDS.

THE Ornithology of North America has hitherto had a full share of attention. Forster, in the *Philosophical Transactions* for 1772, and Hearne, in his account of his journeys, are original authorities, relative to many of the native birds of Hudson's Bay; the scientific compilations of Latham and Pennant record all that was known up to the dates of their respective works. Since their time we have the assistance of the splendid publication of Vieillot on the Birds of North America, whilst the accounts given by Captain Sabine, of the Zoology collected in the two voyages which he made to the Polar Seas, have made the feathered tribes of the Arctic regions familiar to us. The description of the birds collected in the voyage with Captain Ross to Baffin's Bay, will be found in the twelfth volume of the *Transactions of the Linnean Society*; the account of the Zoology seen during the expedition to Melville Island has been published as a *Supplemental Appendix* to Captain Parry's account of that voyage.

There would, however, with all these, have been much wanting, but for the publication of Wilson's *American Ornithology*. Untaught, and without the aid of scientific books, he has produced a work which, for correctness of description, accuracy of observation, and acuteness of distinction, will compete with every publication of natural history yet extant: nor is it alone on these excellencies that the character of his book stands so high; the beauty of the style, and perspicuity of the narrative, add unrivalled charms to its scientific merits. The information contained in his volumes, has made the composition of the following notices a work of comparative ease. It is hoped, however, that, notwithstanding the greater part of the birds have been previously well known, some additional lights have been afforded, and it is very agreeable to add, that a few subjects are entirely new.

The general arrangement of Genera proposed by M. Temminck, in the introduction to the second edition of the *Manuel d'Ornithologie*, has been exactly followed, and in every case the birds have received his generic names.

Considering the length of time passed in the journey from York Factory to Point Turnagain, and in the return, and the different tracts of country passed through, it will be obvious, that nearly all the birds which are inhabitants of the upper portions of America must have occurred to the observation of the travellers; and, consequently, that the account might include the whole Ornithology of northern America.

It is, however, proposed to extend the notices to those birds only, of which actual specimens have been received from the Expedition; this will account for the omission of many species well known as natives of the districts visited, and which probably did not appear to be objects of sufficient curiosity to make it desirable to obtain them.

The specimens collected on the first arrival of the travellers at York Factory were sent, as soon as received in England, to the British Museum, where they became mixed with those of other collections from Hudson's Bay and Baffin's Bay, and the vicinities of those seas; it being impossible to separate them, these have been entirely excluded from this account, which consequently contains a much less number of sea-birds than would otherwise have appeared in it.

The principal supply of specimens was obtained at Cumberland House, in the winter and spring passed there on the journey outwards; some of these have peculiar interest, because, being only summer visitors in the United States, and passing their winters more southward, that station will be recorded as within the migration of these wanderers. Others, and a considerable portion, of the specimens, were collected in the route to the Great Slave Lake and on its borders.

Falco Palumbarius. Goshawk.

The Goshawk is common to the Old and New Continents, living chiefly in mountainous countries; it is a bird of ordinary occurrence, though, in its states of youth and adolescence, it was formerly very inaccurately known. Wilson published it as the Ash-coloured or Black-cap Hawk, not having seen an European specimen to enable him to ascertain its identity; but, with his usual acuteness and correct judgment, he gives his opinion, that his bird is the Goshawk of the European writers. The specimen received was that of a male in perfectly mature plumage.

Falco Borealis. Red-tailed Falcon.

This bird is a native of North America only; it was received by Sir Ashton Lever from Carolina, and has consequently been described by Latham, Pennant, and Gmelin; it is the American Buzzard of the first of these writers. Wilson, who calls it the Red-tailed Hawk, has given a figure of it, and described its habits and character. It is not very common in the United States, but is more frequent in winter than in summer. The specimen now under view accords with the description of Wilson, except that its breast is nearly white, and not ferruginous. It is twenty three inches long, exceeding the length of Wilson's bird by three inches; but, as it is probably a female, the difference may be so accounted for. This bird is remarkably distinguished by the colour of its tail-feathers, which extend three inches beyond the end of the wings, and on the upper side are almost entirely bright ferruginous, with a very narrow brown bar nearly at the end.

Falco Uliginosus. Marsh Hawk.

The bird is well described and figured by Wilson, who conjectured it might be the same as the Ringtail of Pennant and Latham; the latter of which writers has made the Marsh Hawk a variety of the Ringtail; but neither of them seem to have known the Marsh Hawk, except from Edwards's very incorrect figure, which led the former to make short thick legs the characteristic of the bird. The legs of the Marsh Hawk are remarkably long and slender, in which point the birds of the division of the genus Falcon, to which it belongs, all agree. It is now well known, that the Ringtail is the female bird of the F. Cyaneus, or Hen-harrier of British Ornithologists, which, when mature, is an uniform bluish-grey colour; if, therefore, the Marsh Hawk and the Ringtail were the same, a male of corresponding plumage would have been known to Wilson. On comparison of the specimen of the Marsh Hawk with that of a Ringtail now before us, the differences are strikingly obvious. The ferruginous colour of the under parts of the Marsh Hawk bring it nearer to some states of the Ash-coloured Falcon of Montagu; but in this case, the different colour of the male affords also an obstacle to *their* identity. The Marsh Hawk is probably peculiar to America; and it is not impossible that the F. Hudsonius, or Hudson's Bay Ringtail, which is also founded on a figure of Edwards, may hereafter prove to be the same bird in a younger state.

Strix Funerea. Hawk Owl.

This bird is the only one of the genus received from the Expedition, but several other species are usually found in the countries visited. The Hawk Owl is well known, and has often been described: it inhabits all the Arctic countries, and very rarely goes beyond them. Wilson, who figured it, had only seen two specimens. It is one of the most beautiful of the genus, from the generality of which it differs in flying, and taking its prey by day. The specimen received has much more black than accords with the descriptions or the figures which have been published of it. Writers do not agree as to the differences between the sexes, some represent the male, and some the female as the darkest.

Corvus Corax. Raven.

This is one of those birds which inhabit all parts of the globe; it seems to be rather abundant in the northern parts of America; several were seen at Melville Island. A single fine specimen is in the collection.

Corvus Hudsonius. Hudson's Bay Magpie.

A new and hitherto undescribed species. The writer of this notice was acquainted with its existence previous to the departure of the Expedition, having been some

time before in possession of a specimen from Hudson's Bay. It has no doubt been confounded with the Common Magpie (Corvus Pica,) to which it bears much resemblance. Pennant in the *Arctic Zoology* mentions the Magpie as occasionally visiting Hudson's Bay, where it is called by the natives the Heart Bird, but he does not notice any difference in its appearance. Forster, in the *Philosophical Transactions* in 1772, also says that the Magpie, then received from Hudson's Bay, did not differ from the European one. The Common Magpie is described and figured in *Wilson's American Ornithology*, as a rare bird in the United States, and only lately discovered in the Missouri country; but as specimens of it have also been received from Hudson's Bay, there is little doubt that both species are inhabitants of the New World. The Hudson's Bay Magpie is of less size in all its parts than the Common Magpie, except in its tail, which exceeds that of its congener in length; but the most remarkable and obvious difference is, in a loose tuft of greyish and white feathers on the back. The following is a description of the bird under notice:—length, exclusive of the tail, seven inches; head, neck, breast, and upper part of the back pure black; belly and scapulars white; the primaries brownish black, partly white on the inner web; secondaries and greater coverts dark glossy blue; across the back is a tuft of long soft loose feathers projecting above the others, dark grey below, and tipped with white; thighs, vent, and tail coverts black like the upper parts; tail truly wedge-shaped (étagée,) from eleven and a half to twelve inches long, (that of the Common Magpie being from nine to ten inches,) richly glossed with blue, green, and purple, the two exterior feathers half the length of the two middle ones, which are two inches longer than those next to them; bill, legs, and claws black. Two specimens were received, both killed on the 10th of November 1819, at Cumberland House, being caught in traps; they were male and female, but there is no difference in the sexes, except that one rather exceeds the other in length, the one marked as female, being the largest.

Corvus Cristatus. Blue Jay.

A well-known bird inhabiting all parts of North America, but confined solely to that country. Linnæus adopted the bird from Catesby into the *Systema Naturæ*; but it was not well described until Wilson's publication, when he corrected the errors of former writers, and described its habits and manners in the beautiful and delightful style so peculiarly his own.

Corvus Canadensis. Canada Jay.

The Canada Jay is confined to the northern parts of America, visiting the southern parts only in very severe weather, as it does not regularly migrate. Wilson only once saw a few of them together in the United States. His figure of the bird is too highly coloured. In Canada, these birds are abundant, and well known, being of familiar

manners, approaching the habitations of men, and attending the hunters, to whom they are troublesome, in taking the baits from their traps. They are named by the natives Whiskey-Jonish which has been changed by the English into Whiskey-Jack. The bird is small, in comparison of its congeners, and is without the brilliancy of plumage belonging to other Jays, being particularly plain; the looseness of its feathers is further injurious to its appearance.

Oriolus Phæniceus. Red-winged Oriole.

A common bird in Virginia, and in the contiguous parts of the United States, and well known from the depredations it commits on the crops of Indian corn. These birds migrate into Louisiana, and the southern districts in the winter, and extend their progress northward, in the summer, even to the remote parts of Canada. It was formerly called the Red-winged Starling, and Wilson, from its similarity of manners to the Common Starling, has placed it in the genus Sturnus. The brilliant scarlet patch on the shoulder of the wings of the males, contrasted with the general black of the remainder of its plumage, makes it very remarkable when in flight. The specimen received is that of a male.

Oriolus Baltimore. Baltimore Oriole.

A male specimen of this pretty and interesting species was taken. The Ornithological writers of Europe have described a bird of another species (O. Spurius) as the female, but the error has been corrected by Wilson, whose account of the Baltimore Oriole is excellent. The male is remarkable for the fine black and brilliant orange which diversify its plumage, which, in the female, is less splendid, being yellow, rather than orange, and having less of black than the male. These birds go southward in the winter, and return to breed in the spring in the more temperate parts of North America, fixing their abodes for that purpose in orchards and gardens, contiguous to houses, where they make themselves acceptable by their agreeable song; their food is principally insects, consequently they are not such troublesome neighbours as others of the same genus; the splendour of the males must be a very ornamental addition to the beauties of an American garden.

Icterus Quiscala. Purple Grackle.

The Purple Grackle, known to the American farmers as the Crow Blackbird, resides during the winter in the southern provinces of the United States, and moves northward in the spring even beyond Canada, for the purposes of breeding. The specimen received, which is that of a male, exhibits beautifully the glossy splendour of its dark plumage. The Purple Grackles are very injurious to the corn crops in the United States; in company with the Red-winged Orioles they attack the fields of

maize, and destroy often a great part of the crop. It has been removed by M. Temminck from Gracula, to the genus in which it is now placed.

Sturnus Ludovicianus. Meadow Lark.

The Meadow Lark was described by Linnæus both as an Alauda, and as a Sturnus, and even the careful and accurate Brisson, fell into the same error; they considered that they were describing different birds. The two were brought together as varieties of one species, by Dr. Latham, the one being placed as a native of Carolina, and the other of Louisiana; but these are probably not varieties, but the same bird in different states of plumage. The manners and habits of the species have some accordance with those of the genus Alauda, and as it usually frequents low grassy fields, it has acquired the name of Meadow Lark in America. These birds migrate partially, for some remain in the same parts of the United States the whole year. Two specimens were received, apparently male and female, one being less brilliant in colour than the other. The bird is larger than the Common Starling, mottled over the whole upper parts with dark and light brown, having a white stripe along the middle of the head; the under parts are bright yellow crossed on the neck with a crescent of black, whence it has been called the Crescent Stare.

Turdus Migratorius. Red-breasted Thrush.

This bird is noticed both by Hearne and Forster; it is well known in the United States as the Robin. In its notes, manners, and habits, it bears a strong resemblance to our Common Thrush, supplying the place of that delightful songster to the inhabitants of North America, in every part of which it is known at various periods of the year. The specimen received is not so brilliant as that figured by Wilson, and is probably therefore that of a female.

Lanius Excubitor. Great Cinereous Shrike.

This butcher bird is an inhabitant, though not particularly abundant, of the northern parts of Europe, Asia, and America. Wilson doubted whether the American bird was the same species as is known and described under the above name by European naturalists; but a comparison of specimens, which he had not the opportunity of instituting, is decisive of their identity. From its bearing a general resemblance in its plumage to the Canada Jay, it has obtained among the settlers round Hudson's Bay the name of White Whisky-john.

Sylvia Æstiva. Yellow-polled Warbler.

The yellow colour of this little bird is not confined to its head alone, but extends

conspicuously over the whole lower part of the body, the breast being prettily dashed with touches of red. It is a very small species, corresponding in size, and resembling in manners, the Yellow Wren (S. Trochilus,) of Europe. Though found in the northern parts of America in the summer, it is said not to breed there; this, however, seems very questionable, for all the regular migrants at that season which proceed northwards, probably rear their brood during the interval after such movement. Wilson has called the bird S. Citrinella, Blue-eyed Yellow Warbler, and has very properly corrected an error of Buffon, who described a different species as the female.

Emberiza Nivalis. Snow Bunting.

Two specimens in their winter plumage were received. Snow buntings are found in all places near the Arctic Circle, proceeding towards the most northern lands with the first appearance of spring in those dreary regions, and leaving them only when no longer habitable to any of the feathered race.

Pyrrhula Enucleator. Pine Grosbeak.

A single specimen of a young bird was received. It appears from Hearne, that this species is well known in Hudson's Bay. It is also described by Foster, and by Ornithological writers generally, as an inhabitant of the Arctic countries wheresoever it can find trees and shrubs, on the buds of which it subsists. It does not go far south, and is noticed by Wilson as rare in Pennsylvania. The Pine Grosbeak, as well as two species of Cross-bills, all natives of cold countries, have much red in their plumage when young, which turns to orange as they advance in age; such alteration from bright to less splendid plumage, in the progress from youth to maturity, is contrary to the usual course of nature in birds. M. Temminck has transferred the Pine and other Grosbeaks to his Genus Pyrrhula, confining Loxia to the Cross-bills.

Pyrrhula Ludoviciana. Red-breasted Grosbeak.

Wilson, who describes this bird under the name of Loxia Rosea, Rose-breasted Grosbeak, does not trace it into the southern states; it is found in the fall of the year in New-York and New England, and from the specimen before us appears to migrate into the more northern parts where it probably breeds, retiring towards Louisiana for the winter. It is the Rose-gorge and the Gros-bec de la Louisiane of Buffon, and has been described by Latham and Pennant, as well as by Gmelin, as one species under the names of Loxia Ludoviciana or Red-breasted Grosbeak, and as another species which they have called Fringilla Punicea or Red-breasted Finch. The specimen received is that of a young male, the back of which is mottled with black, ash-colour, and some little white; the crimson feathers of the breast extend nearly to the lower

mandible; in the mature bird the whole back as well as the head is black, and the bright colour on the breast is separated from the bill by the black which passes under the chin. It is a beautiful and elegant bird. The Cree Indians distinguish it by a name indicative of the strength of its bill.

Fringilla Pecoris. Cowpen-bird.

Very little more than the name and general appearance of this extraordinary bird was known until the publication of Wilson, and that little seems to have been derived from Catesby's meagre account. Wilson, most correctly observing that it ought not to be ranked as a Fringilla, has called it an Emberiza, but it seems to have greater affinity to Oriolus, though not exactly according with that genus. It passes the winter in the lower provinces of the United States, moving northward in the spring, associating with the Red-winged Orioles and Purple Grackles, and lives more on insect food than on grain, collecting its nourishment among the herds of cattle, whence its common name. A male specimen alone was received; it is eight inches long, the whole head is dark-brown, and the entire remainder of the plumage glossy black. The female is said to be brown and not black, with the head proportionably lighter. The great peculiarity of this bird, first brought into notice by Wilson, is that, like the Common Cuckoo, it deposits its eggs in the nests of other and smaller birds, who hatch, feed, and rear the obtruded offspring of the interloper. Wilson's account of this circumstance and narrative of the discovery, is particularly clear and interesting.

Picus Auratus. Golden-winged Woodpecker.

America abounds in Woodpeckers, but this species seems to extend over a greater portion of it, than any other. Hearne states that it is the only one which is found in the northern parts of Hudson's Bay. It spreads far to the south in the United States, and was observed by Captain Cook at Nootka Sound. It migrates to the more southern parts of its range in the winter, though Hearne states that they are found in Hudson's Bay during that season; whilst Forster says that they come to Albany in April, and depart in September. These birds are dressed for the table by the Americans, and are occasionally sold in the markets for such purpose. Linnæus first described the species in the tenth edition of the *Systema Naturæ* from Catesby, and misled by the shape of the bill, which is more curved and pointed than in others of the genus Picus, made it a Cuculus; he subsequently, however, changed its position. There seem to have been other errors respecting this bird; it was considered not to be a climber, nor to take any part of its food from under the bark of trees, but Wilson, from personal observation, has contradicted both these suppositions. The specimen is that of a female, as it wants the black stripe on

the sides of the throat, which distinguish the male bird. Wilson's description is full and perfect; it can be mistaken for no other American species of Woodpecker, as the peculiar formation of its bill, and the golden colour of the shafts of all its quill-feathers and of part of those of the tail, make it known at first sight. It is a handsome bird, the small round black spots on the under parts, the large black crescent on the breast, and the smaller scarlet one at the back of the head, are striking beauties.

Picus Villosus. Hairy Woodpecker.

The Hairy Woodpecker has also an extensive range, being found as far southward as Georgia, and was described by Forster from Hudson's Bay. Hearne mentions a Woodpecker with a red head, which frequents the eastern and southern parts of Hudson's Bay, which is probably this species. It is every where abundant, and is not migratory. Latham, in his *Supplement*, supposed it to be a native of Great Britain, on the authority of specimens belonging to the Duchess of Portland, said to have been killed near Halifax; but, though taken up by British writers, it is not included in the European catalogue of M. Temminck. It is not improbable that the specimens alluded to by Latham were from Halifax in North America. Wilson has given a perfect description of the bird, but in the figure the tail is not correct; the under part, which has white feathers, is represented as the upper part, the feathers of which are black. The name is derived from the plumage on the back, which has some similitude to fine hairs. Our specimen is that of a male bird, having the red mark on the back of the head, and is ten inches in length; Wilson gives nine inches as its usual length.

Picus Varius. Yellow-bellied Woodpecker.

The Yellow-bellied Woodpecker continues permanently in all parts of North America where trees are found, and is abundant. It is of small dimensions, varying in length, according to different writers, from seven to nine inches. The specimens received were those of a male and a female, and were intermediate in size between the above extremes; there seems to be some variation in the black and white markings, not only between the sexes, but between different males. The male bird now under notice has very little white on the back, but the female is elegantly marked with cross waving bars of black on the white; the yellow colouring which gives the name to the species is very slight; the red on the throat and head of the male is very rich.

Alcedo Alcyon. Belted Kingfisher.

This is the only species of Alcedo found in the whole of North America; it is, however, an inhabitant of every part of it, from the north to the south, and from the

eastern to the western shores; it does not remain in the colder parts in the winter, but migrates southward. It is met with in the islands of the New World under the tropics, and even extends itself to the southern continent, living on the banks and shores of rivers. From the different states of plumage of this bird, a number, to the extent of four varieties, as they are erroneously called, have been described or figured. If we can depend on the accuracy of Wilson, which is rarely questionable, those with ferruginous markings on the breast, and where the upper plumage is spotted, are females; the other varieties are probably immature birds. It is sometimes exposed for sale in the markets of America, and, when fat, is good eating. Wilson's description is correct; it is the only perfect one of the male, for Brisson, Linnæus, Latham, and Pennant, describe only the female; some of these authors also err much in their account of the size of the bird. The figures in the *Planches Enluminées*, and in Edwards, are either females or immature. Wilson's also is a female; so that the male does not appear to have been represented. The species is not mentioned, either in *Hearne's Voyage*, or by Forster, in the Catalogue of the Hudson's Bay birds, in the *Philosophical Transactions* for 1772. Our specimen is that of a male; it is rather more than twelve inches long, and has a narrow slate-coloured belt across its breast, without any ferruginous colour on its under parts, which are white, with the exception of some markings of slate colour on the sides under the wings. The bill seems to vary in its length; Wilson makes it three inches; in the present specimen it is only two inches and a half.

Hirundo Purpurea. Purple Martin.

This bird, which, in size and rapidity of flight, approaches the Swift, has the habits and manners of the House Martin (H. Urbica), and seems equally to have attached the favour of the Americans, to whom the European bird is unknown. It is probably the Swallow of Hearne. The Martins breed generally over the whole of North America, and retire, it is supposed, within the tropics in the winter. They arrive in Hudson's Bay in the end of May, and leave it in August, but come sooner and retire later in the more southern districts. The male, of which alone a specimen was received, is an uniform glossy black; the female is more brown, with dingy white on its under parts. Latham, in his *Synopsis*, had described it as the Violet Swallow, Purple Swallow, and Canada Swallow; but in his *Index* he brought these names together under Hirundo Purpurea. The food of this bird is a much larger class of winged insects than its congeners destroy with us.

Hirundo Viridis. White-bellied Martin.

Is peculiar to America, and was not noticed as distinct, until described by Wilson. Its habits and manners are somewhat similar to the House Martin, but it builds

in holes or boxes, and does not form an earthen case for its nest, as is done by that bird. The whole upper parts of the bird are black glossed with bright blue; the tail is much forked, and the wings are so long as to extend beyond the tail; the under parts of the head, neck, and body are white; the wings are brown, both above and below; and the tail feathers are similar, but the under coverts are white; the length is about six inches and a half. The specimen was killed at Cumberland-House. Hearne mentions Martins as frequenting Hudson's Bay, probably these birds.

Columba Migratoria. Passenger Pigeon.

The details given by Wilson of the habits of these extraordinary birds are most interesting. Their migrations appear to be more in search of food than of climate; though found in all parts of northern America, east of the Rocky Mountains, their chief resorts seem to be the countries contiguous to the Ohio. They breed together in great numbers, rearing only one young at a time, but have three or four hatches in each season; though they prefer living thus in common, they are frequently known to make their nests in detached places. They are described by Forster, but not mentioned by Hearne; they come, however, to the countries near Hudson's Bay, and sometimes remain there late in the season. It seems likely that, as population and cultivation extend westward, the countless multitudes of these birds, which darken the air for hours and miles together in their flight, will be reduced; their visitations must be ruinous to agricultural districts, and consequently incompatible with civilization; indeed, it is probable that their less frequent appearance in the Atlantic States has been caused by the necessity they have felt to retire from the frequented abodes of man.

Tetrao Umbellus. Ruffed Grouse.

Specimens of a male and female were sent from Cumberland-House, where they were killed, in November, 1819. This species is stated by Wilson to be called the Partridge in the Eastern States, and the Pheasant in Pennsylvania and the southern districts, but must not be confounded with the bird in the next article, which is more usually known as the Pheasant, and with which Wilson does not appear to have been acquainted, when he wrote on the Ruffed Grouse. This species is found in every part of the United States, as well as in the countries west of the Mississippi; it is well known to the British settlers in the northern parts also, where it has been called the Shoulder-knot Grouse, as well as the Ruffed Grouse, the Indian name being Puspuskee. It is described both by Forster and Hearne. This species is an inhabitant of woody countries only, in which it differs from the Pinnated Grouse of America, (Tetrao Cupido) better known to the sportsmen of the

New World under the appellation of the Prairie Hen and Heath Hen. The female differs from the male in being smaller, in the colours of its markings being lighter, and in the ruff being composed of smaller feathers; the ruff in the male is entirely black, in the female it is dark brown with some rufous tinge. The figure, published by Edwards, is probably that of a female; the Grosse Gelinote de Canada of the *Planches Enterminées* is intended for the Ruffed Grouse, but is a miserable resemblance. This bird was described by early Ornithological writers under two different names, which error may be thus traced. Brisson described and figured the Grosse Gelinote de Canada correctly, and not considering that Edwards's Ruffed Grouse (of which he judged by the defective figure), could be the same bird, he introduced it into his *Règne Animal*, as the Gelinote Hupée de Pennsylvanie. Linnæus adopted these as two species, making the first T. Togatus. and the other T. Umbellus. Latham, in following Linnæus, called the T. Togatus, the Shoulder-knot Grouse, and the T. Umbellus, the Ruffed Grouse; in the *Supplement* to his Synopis, he retracted the opinion of their specific difference, and in his *Index* applied the former specific name to the female, and the latter to the male bird, but has strangely confounded and misarranged the synonyms in separating the sexes. M. Cuvier, in his *Règne Animal*, has considered the T. Cupido and T. Umbellus as the same bird, a strange mistake.

Tetrao Phasianellus. Sharp-tailed Grouse.

This bird is probably confined to Canada, and the northern parts of the New World, since specimens are not usually received from the more southern provinces; nor does it appear to have been at all observed by Wilson. Little reliance should be placed on the statement by Edwards, that it is found in Virginia; Dr. Mitchel, whose authority is given for this, made the observation on a view of Edwards's drawing, which he might have mistaken for a Ruffed Grouse, which bird is an inhabitant of Virginia. The bird now under consideration is well known and common in the neighbourhood of the Hudson's Bay settlements, where it is called the Pheasant, or Sharp-tailed Grouse; this latter name is much more appropriate, than Long-tailed Grouse, which it received from Edwards. The tail is really short, but the two middle feathers, exceeding the others about an inch in length, give a pointed appearance to that part, which is peculiar and characteristic. Edwards first brought the bird into notice, but his figure is a very bad resemblance of it. The Sharp-tailed Grouse are noticed by Hearne, and described by Foster; they are found both in the woods and in the plains, and are called by the natives of the northern parts of America Au-kis-kow. Linnæus, in the 10th edition of the *Systema Naturæ*, called this bird the T. Phasianellus, founding the species on the figure and description of Edwards; in the twelfth edition of the same work, he made it a variety of his T. Urogallus; subsequent experience has proved

that the first opinion was correct, and Phasianellus remains the established specific name. There is no difference observable between the sexes, but the summer plumage is brighter and darker than the winter; specimens in both states were received, the latter from Cumberland-House, the former from the neighbourhood of York Factory.

Tetrao Saliceti. White Grouse.

The differences between the species of Grouse which assume white plumage in winter, have been very imperfectly understood until lately; it is not, therefore, extraordinary that in the accounts of these birds, particularly in those of early writers, the descriptions should have been incorrectly referred to the different species, more especially as the three kinds which are now known, are all in some instances inhabitants of the same countries. The species now before us takes precedence, on account of its size, by which, and the following peculiarities, it is distinguished. In summer its colour is dark chestnut, with little marking of other colour on the breast, and generally with less of the white and black spots, and undulating lines, which vary and cross the feathers of the others; it is without any black line of feathers from the bill to the eye, so that in winter, with the exception of the tail and the shafts of the wing-feathers, it is entirely white; the bill is short, strong, and black, and the claws, which in the other two species are black, in this are white; the legs and feet are thickly covered in winter with feathers, which have some resemblance to the hair of quadrupeds. The remarkable property which Grouse, that become white in winter, possess, of doubling each feather, is well known to naturalists; from the base of the shaft of all the feathers which cover the bodies of the birds, there proceeds, on the under side, a small, but perfect feather, of a downy softness, which is no doubt a provision of nature to protect them from the inclemency of the winter to which they are exposed. The White Grouse, of the countries round Hudson's Bay, are inhabitants of the plains, where bushes of willows abound, on the buds of which they support themselves; from this circumstance they have acquired the appellation of Willow Grouse, or Partridges, among the settlers, as well as the present specific name given by M. Temminck, in preference to that of Albus, by which the species was designated by Linnæus. It is the Lagopede de la Baie de Hudson of Buffon. Hearne has given a good account of these birds, and states them to be most abundant in the parts of North America which he visited. Specimens, in perfect white plumage, or with very few coloured feathers, are frequently received from Hudson's Bay, but are of rare occurrence in the summer dress. The bird was figured by Edwards under the name of the White Partridge, but his specimen was only partially white, being in a state of change. Forster, who received it amongst the collection he

described, compared it with the European Ptarmigan, and has widely erred in concluding them to be identical. The White Grouse, in its summer plumage, was considered by M. Temminck to be the Red Grouse of Great Britain and Ireland; he has, however, retracted this opinion in the Second Edition of his *Manuel*. The T. Scoticus, or Red Grouse, never changes its colour in winter, though it may accidentally vary to white, and is solely confined to the British Islands, existing no where else as a native inhabitant, whilst the T. Albus is not found in them.

Tetrao Lagopus. Ptarmigan.

The Ptarmigan and Rock Grouse (T. Rupestris) were until lately, described generally as the same bird; indeed it may be said by every writer, because though Pennant has introduced the latter into his *Arctic Zoology*, he was certainly unacquainted with its characteristics, and only noticed it because a bird with that name had been mentioned by Hearne. In describing the birds seen during Captain Parry's late voyage to the Polar Seas, Captain Sabine has distinguished the Rock Grouse from the Ptarmigan as a distinct species; his reasons for this separation, and the characters of each species, will be found in detail in his *Appendix* to the narrative of the Voyage. The Ptarmigan has been found on the land situated between Davis' Straits and Regent's Inlet: the Rock Grouse, was abundant at Melville Island, and had also been killed in Greenland in the former Voyage; the Ptarmigan corresponded with the birds usually so called in the British Islands, and the Rock Grouse are the same as birds which have since been abundantly sent by Mr. Andrew Knight, from Norway; where they are considered as Ptarmigans. It is of importance to ascertain from actual examination of specimens, now that these birds are distinguished, in what countries they each are native. In Scotland and the adjacent Islands, the Ptarmigan alone exist; whether it is to be found in Norway and the mountainous countries of the north of Europe, yet remains to be determined. The specimen now under notice, which was obtained in the neighbourhood of York Factory, proves that the Ptarmigan is a native of that part of America; but as no specimen of the Rock Grouse has yet come under observation from the same quarter, it still remains uncertain whether individuals of the smaller species go so far south; when they leave the Islands of the Polar Seas, they of course retire to the contiguous continent, but to what part of it, is yet to be ascertained. Hearne's account of the Rock Grouse will apply as well to the T. Lagopus as to the T. Rupestris; and as he mentions only one kind, it is possible that the real Rock Grouse may not come to Hudson's Bay. If this be the case, the specific name now given to it has been wrong applied, for the T. Rupestris of Gmelin is founded solely on Pennant's Arctic Zoology, and that is derived from Hearne. The specimen which has been observed on here, is in its summer dress, and corresponds nearly, both in size and colour of plumage, with those from Scotland killed at the same season.

It has in particular, besides the fourteen black feathers in its tail, the two long superincumbent feathers mentioned by Captain Sabine, as peculiar to the species, exclusive of the six other superior coverts; these two feathers are tipped with white, and are otherwise nearly black, but have some mottling of the general brown of the plumage on them; the six superior coverts are mottled black and brown with white tips; the fourteen tail feathers are black, part only of them being very slightly tipped with white.

Tetrao Canadensis. Canada Grouse.

These are the Wood Partridges of Hearne and of the North American settlers. They are only found in the northern parts of the New World, not having been observed in the United States, nor are they natives of Europe. Though remaining in the cold climate of those countries during the winter, their plumage continues unchanged. Specimens both of a male and female bird were received in good condition; their size is that of the Ptarmigan, and of course they are considerably larger than the Rock Grouse. Both sexes are tolerably described in *Latham's Synopsis*; and are each figured by Edwards, as well as in the *Planches Enluminées*, the species being called by Buffon La Gelinote du Canada. The male was made a separate species from the female, by Brisson, which led Linnæus into a similar error, and this was not corrected by Gmelin; they will be found in the *Systema Naturæ*, as T. Canadensis and T. Canace.

Charadrius Pluvialis. Golden Plover.

A specimen, in winter plumage, is in the collection. Golden Plovers were found breeding abundantly in the North Georgian Islands, and they probably exist throughout the whole of the higher latitudes of the American Continent, but they are only known in the United States, as visitors from the autumn until the spring. In the latter season their whole under parts become black, which disappears with the moulting after the young are reared. In this darkened plumage they are the C. Apricarius and Alwagrim Plover of different Ornithological writers. The species is well known in Europe.

Charadrius Vociferus. Noisy Plover.

This species is confined to America, and breeds in the more temperate as well as in the northern parts of that country. It is known to the Americans as the Kildeer, from the note which it utters incessantly, when disturbed. Wilson has figured and described the bird correctly; it is much smaller than the preceding, and approaches more to the appearance of a Ringed Plover, but is peculiar in having a long wedge-shaped tail, the upper coverts of which are orange; the rest of the upper parts of

the body are brown, and the under white, the neck is surrounded by a ring of white, below which is a similar band of black feathers.

Charadrius Hiaticula. Large Ringed Plover.

Ringed Plovers are abundant in all parts of North America; extending also to Greenland and the lands contiguous to Lancaster Sound; in Europe, they are equally common. We have here to notice a circumstance of rare occurrence; Wilson's figure is very defective, and does not accord with his description. M. Temminck has taken much pains to describe and separate the different species of Charadrius, which may be generally termed Ringed Plovers, to the first of which the specimens now received belong. They are subject to considerable variation in minute particulars, as respects the size and intensity of the dark bands on their heads and necks, as well as the proportions of white on the feathers of the tail. Latham's description of this species, in his *Synopsis*, is particularly clear and correct. The specimens received, though agreeing with the accounts referred to, are smaller.

Vanellus Melanogaster. Grey Plover.

The specimen of this species is in the varied state which the mature birds exhibit, in the progress of change from the winter dress to that of the breeding season: the breast is mottled with black and white; it ultimately becomes black, and in winter, white. The Grey Plover breeds inland, but resorts, at other times, to estuaries and mouths of great rivers. It is figured by Wilson, and his representation and description are both correct; but he has applied to it the names we have mentioned as belonging to the Golden Plover in its summer plumage, *viz.*, that of Charadrius Apricarius, or Alwagrim Plover. This species, like many others which have different plumage at different seasons, has received various names: it has been called, in its winter state, Tringa Squatarola, or Grey Sand-piper, and in its summer dress, Tringa Helvetica, or Swiss Sand-piper: as the first, it is well known on the south-eastern coast of Great Britain. M. Temminck has proposed the transfer of this bird, and its congener, the Lapwing, to the genus where it is now placed, which was formerly established by Brisson.

Strepsilas Collaris. Turnstone.

A specimen, obtained in the neighbourhood of York Factory, was received. It is in a state of change approaching maturity, having some of the deep orange-red feathers,which indicate a bird in perfect plumage, mixed with brown feathers on the back. Turnstones are found in various and remote parts of the world; they were observed to breed at Melville Island, and are met with in all parts of North and South America, as well as in Europe, and are also said to be natives of Africa.

Grus Canadensis. Brown Crane.

The Cranes have been separated from Ardea by modern writers, and now constitute the genus Grus: hence the name at the head of this article. It may be supposed that the Brown Crane is rare in the United States, for Wilson does not seem to have seen it, and he conjectures, under the head of the Hooping Crane, that it is the young of that bird; there are, however, abundant points, independent of the colour of the plumage, to convince those who compare them, of the difference. Hearne says, that the Brown Crane is much more numerous in Hudson's Bay than the Hooping Crane, and that its flesh is considered good for eating: it frequents the lakes of the northern parts of America, breeding there, and retires in the winter southward, probably to Mexico and the warmer countries west of the Mississippi. This bird was originally published by Edwards; his figure of it is, however, much too splendid. Linnæus founded the species on Edwards's description. The specimen sent home is probably of a male, its size exceeding that which is mentioned by authors: it is upwards of four feet in length, which is nearly a foot longer than the measure assigned by Pennant. The top of the head is bare, with a few black hairs on it: the bill, to the junction of the mandibles, five inches long; back of the head ash-coloured, tinged with rusty; the whole of the plumage of the body is dark ash colour; the primary quill feathers are dark brown with white shafts, and the other feathers of the wings are lighter than the rest of the plumage; the legs are bare for four inches above the knee.

Argea Lentiginosa. American Bittern.

The history of this bird is very singular; it was first described by Edwards, who, though he stated some difference, especially that of size, between it and the Common Bittern (Ardea Stellaris) left it unsettled whether it should be considered as a distinct species or not. Linnæus did not notice it, nor did he refer to Edwards, and every subsequent writer until the year 1813, included it as a variety of the European species. In that year appeared the *Supplement to the Ornithological Dictionary* of the late Colonel Montagu, in which is described and figured, a specimen of a young bird of this species, as a British bird, under the name of Ardea Lentiginosa. Montagu's account is, that the bird was shot in the autumn of 1814, at Piddleton, in Dorsetshire, by Mr. Cunningham, who sent it fresh to Colonel George, of Penryn, in Cornwall, in whose museum it was called Ardea Minuta, and under that name purchased by Colonel Montagu. If the above account of the place where the bird was killed be correct, it must either have escaped from some menagerie, or have been driven by accident from the North American coast to the British shore. Colonel Montagu, not aware what the bird really was, described it, and doubting whether it was new or previously known,

called it Ardea Lentiginosa, which specific name, though given under such peculiarly unscientific circumstances, being the first which had actually been applied to it, must of course remain. Wilson's account and figure of the bird, which he calls Ardea Minor, appeared in 1814. Montagu's description is full and correct, but that of Wilson distinguishes the characteristic points of the plumage, with more precision. On comparing the specimens of the two birds, the differences are very obvious; the bill of the American is nearly an inch longer than that of the other; the general complexion of the plumage in the American is brown, with less decisive markings; that of the European is pale, with the markings very dark, and well defined; the European is without the black mark on the side of the neck, which is so peculiar in the American; and finally, and *conclusively*, as is conceived, the primares, in the American, are dark lead-coloured, whilst those of the European are marked with alternate bars of dark brown and light ferruginous. The American is also said not to make the loud booming, which is so peculiar in the European species. The American Bittern is found in Hudson's Bay, and the adjoining countries; in Canada; and further to the southward, in the United States; it breeds in swamps, probably returning from the colder countries in the winter. It conceals itself in the rushes in the day, and seeks its prey at night. It is not very common, nor confined to particular districts, and is said to be good food when fat.

Tringa Variabilis. Dunlin.

The specimens of this bird are in the summer plumage, under which it is known on the coasts of Great Britain, as the Dunlin, and in America, as the Red-backed Sandpiper; it does not remain in the Arctic countries, or even in the northern parts of America, in the winter; the alteration of appearance, common to it with all the rest of the tribe to which it belongs, has caused it formerly to receive another name at that season; it being the Purre of all writers, except the most recent. M. Temminck has been very successful in the second edition of his *Manuel*, in describing its different changes, and in collecting the many synonyms, which belong to it, the number of which make the specific name under which it stands at present, very appropriate.

Tringa Minuta. Little Sandpiper.

Wilson has called this diminutive Sandpiper, which does not exceed six inches in length, Tringa Pusilla. It appears from his account that it does not remain even in the middle parts of America during the winter, but quits them, migrating to the southward in October. It is found in all parts of the known world on the borders of the ocean; it also goes inland to the shores of large waters. Several specimens were taken by the travellers at different parts of the journey in the summer season, the

breeding places of the bird being in the northern regions, but it is not mentioned by Captain Sabine as visiting the Islands of the Arctic Sea.

Totanus Vociferus. Tell-tale Godwit.

Previous to the publication of Wilson, we had no further information respecting this species, than is contained in a short note in the *Artic Zoology*, where it is said to have been received from the coast of Labrador, under the name of Stone Curlew; on this authority it was introduced by Gmelin into the *Systema Naturæ*, as Scolopax Melanoleuca. Wilson called it Scolopax Vociferus; it belongs, however, to the division of the Genus, now known as Totanus. The Tell-tale Godwit, or Snipe, breeds in the American States in marshy grounds, and has acquired celebrity from the protection it affords to the race of aquatic birds from the attacks of the sportsman, being very vigilant: when it discovers the approach of any person towards its haunts, it rises on the wing, and, by a continued uttering of its very shrill notes, gives the alarm to the ducks and other game which are within hearing at their feed, when they immediately take flight. These birds retire to the southward in the winter season. The specimen received was in a very perfect state; it measured sixteen inches in length; the bill is two inches and a quarter long, having the upper mandible a little bent at the end; the throat, belly, and vent, are white; the fore part of the neck is marked with longitudinal stripes of dark brown; the sides under the wings are marked across with bands of black, the white progressively predominating towards the thighs; the head and back of the neck are dark, slightly marked with white; the back, scapulars and wing coverts, are dark brown, spotted with white, the white spots being disposed along the edges of all the feathers; the primaries are black, the shaft of the first is white, of the others, black; the rump is white; the tail feathers are beautifully crossed with alternate narrow bands of dark brown and white; the legs are naked, near two inches above the knee; the tarse is two inches and a quarter long; the feet, with their fore toes, long; the hind toe a quarter of an inch long; the legs are said to be a rich orange colour.

Totanus Noveboracensis. Red-breasted Snipe.

This bird, which has been described by Pennant, and, after him, by Latham and Gmelin, as the Scolopax Noveboracensis, as well as the Scolopax Grisea, or Brown Snipe, breeds in the North, visiting the temperate parts of the United States at spring and fall, in its passage from and to its winter quarters. It is in high estimation for the table, and is eagerly sought after by sportsmen, on the bars and shores of the large rivers and places within the influence of the tide, where it feeds. Two specimens, probably in perfect summer plumage, were sent home, differing from each other only in size, one exceeding the other an

inch in length; this, if not arising from difference of season, is difficult to account for. The largest, which it is proposed to describe, measures twelve inches from the tip of the bill to the end of the tail; the bill is two inches and a quarter long; both mandibles channelled from the base, compressed in the middle, and flattened at the end; the throat, neck, and belly are tinged with ochreous or buff, the throat is palest; the neck minutely spotted with brown, and the belly free from markings; the cheeks are pale, like the throat; across them, from the upper mandible to the eye, there passes a dark line; the top of the head is dark brown spotted with ferruginous; the back of the neck mottled dark and light brown; the feathers, on the back and scapulars, are black, edged with bright ferruginous; the feathers of the wing-coverts are dark brown, edged with pale brown; the primaries are very dark, the shaft of the first alone being white; the secondaries are edged with white; the whole back from underneath the scapulars, the sides, and the under wing-coverts, are spotted and barred with black or white, forming a beautiful contrast to the black and ferruginous markings of the upper parts; the tail is pointed, and the markings of black are continued without interruption from the back to its extremity; but as they extend along the tail they gradually change their first character of spots, and become more and more distinctly black bands; the tips of the longest tail-feathers are ferruginous; the legs are bare an inch above the knee; the tarse measures an inch and a half; the three fore toes are long and slender, the hind toe is very thin, and about a quarter of an inch long; the legs are dark green.

Totanus Flavipes. Yellow-legged Godwit.

This bird, commonly known in the United States as the Yellow Shanks, is also stigmatized by the sportsmen of that country as the Lesser Tell-tale, it being nearly as troublesome to them in their pursuit as the Totanus Vociferus. The descriptions of this species, in Wilson, as well as in Latham and Pennant, having been made from autumnal specimens, do not well agree with the plumage of the specimen now before us, which appears to be in its perfect summer dress. It measures nine inches and a half in length; the bill is straight, and about an inch and a quarter long; the upper mandible is grooved, and a little arched at its extremity; the chin, neck, and breast are dingy white, marked with longitudinal stripes of dark ash colour; the head and back of the neck dark brown, a little spotted with white; the whole back, wing-coverts, and scapulars brown, spotted with light reddish brown, the spots being ranged along the margins of each feather; the wing feathers are dark brown, the shaft of the first primary being white; the smaller primaries are slightly edged with white, and the secondaries more strongly so; the upper tail-coverts are white; the belly, sides, thighs, and abdomen dingy white; the under tail-coverts white, slightly barred with brown; the tail feathers brown barred with

narrow bands of dingy white; legs naked an inch and a quarter above the knee; tarse full two inches long; toes slender; legs entirely yellow.

Limosa Fedoa. American Godwit.

The specimen is of a male, killed at Carlton-House on the 20th of May, when the colours of the plumage are in the brilliant breeding state. The genus Limosa, which contains this Godwit, has been separated from the Linnæan genus of Scolopax by Beckstein, and adopted by subsequent writers; the name of Limosa originated with Brisson. This species appears to have been first published by Edwards, whose description is of a male, and is excellent. There seems to be much variation in the length of the bill; in some individuals it has been described as being six inches long; in the present specimen it was only four inches. The names of this bird have been various: it is usually called the Curlew in Hudson's Bay; Wilson calls it the Great Marbled Godwit; Pennant, the Great Godwit; Brisson, La Barge Rousse d'Amerique; and Buffon, La Barge Rousse de la Baie d'Hudson. It breeds in the north, migrating far to the southward in winter, and is met with in the intermediate countries, in spring and autumn, on passage. Wilson has figured a female, which differs from the male in having no black markings on the breast, and probably also in being less highly coloured. His description of the bird is good.

Limosa Melanura. Black-tailed Godwit.

Breeds in the marshes of the country round Hudson's Bay, but does not go so far south as the territories of the United States; at least, the bird not having been noticed by Wilson, is negative evidence to that point. This species, which exhibits, according to its age or the period of the year, great variety of appearance in some parts of its plumage, may be readily distinguished by its tail being a uniform black at all times, with a broad band of white at the base, the feathers being very slightly tipped with white or dusky. In the different states of its autumn and spring plumage, the Black-tailed Godwit has been mistaken for distinct species, and is found in Latham's *Index* and *Synopsis*, as the Scolopax Lapponica or Red Godwit, and Scolopax Limosa or Jaduka Snipe. Specimens of both having come into the possession of Colonel Montagu, he was of opinion after much investigation, that they were not identical; the ultimate determination of the question was therefore reserved for M. Temminck, who has described the bird under its various appearances, and has adopted Leister's name, as indicative of its peculiar character. Two specimens were received, one of which was a young bird, and the other mature, in plumage intermediate between its winter and breeding state.

Gallinula Carolina. Soree Gallinule.

The Soree Gallinule was received by Edwards from Hudson's Bay, and published by him; it is a well-known species, belonging to the American Continent only. In the autumn migration they appear in the United States in great numbers, and from the end of August to the end of September, afford easy amusement to the sportsman, and a plentiful supply to the epicure: being very fat at that season, they are particularly esteemed at table. A single specimen, apparently of a male, was received.

Fulica Americana. American Coot.

Wilson, in his account of this bird, to which he annexed the names and synonymes of the Common Coot, expressed a doubt of their identity; he particularly mentions that the colour of the callous membrane on the forehead of the American, is a dark chestnut, whilst that of its European congener is white. This doubt has induced a comparison of a British specimen with that sent home by Captain Franklin; and the conclusion is, that they are distinct though nearly resembling species. They are of the same length though there is a general inferiority in the size of the body as well as of the legs, head, and bill of the American; the bill is smaller, less thick and strong, and shorter by a quarter of an inch; the callus, independent of the difference in colour in the American bird, extends only half an inch over the head, but in the European above an inch; the whole head is smaller; the plumage generally is similar in colour and character; the outer margin of the first primary feathers of the wing is more conspicuously marked with white, and there are a few white feathers on the upper edge of the wing; the secondaries in both are tipped with white; the principal difference in the plumage is that in the American, the feathers at the vent are quite black, and the under tail coverts white; in the European Coot these correspond with the rest of the plumage; the legs are much more slender in the American bird; the tarse of the European measures near two inches and a half, that of the American not quite two inches; the toes are smaller in like proportion; the middle toe, including the claw, of the European Coot, is three inches and three-quarters long; of the American, three inches and one quarter only.

Phalaropus Hyperboreus. Red Phalarope.

A specimen of this bird was brought home by Dr. Richardson, who also saw the other known species, Phalaropus Platyrhinchus, the Grey Phalarope, but did not preserve a skin of it. Both these species are inhabitants of, and breed in, the most northern parts of the world; and though they retire somewhat more to the south in

winter, yet their visits to the milder climates are rare and casual; Wilson has figured and described both species from specimens which he considered as only accidental. They are subject to much variation of plumage, not only from season, but from diversity of age and of sex; they have consequently been described and named most variously, and even confounded with each other. Much elucidation of their history and changes of plumage was obtained by Captain Sabine, in each of his voyages to the Arctic Seas, and is detailed in his two publications before referred to. These, with the investigations of M. Temminck, which are to be found in the second edition of his *Manuel d'Ornithologie*, have nearly cleared away the obscurity and doubt in which the account of these birds were involved.

Phalaropus Wilsoni. American Phalarope.

This exquisitely beautiful bird, it is believed, has never before been described, or come under observation. It was received in the collection despatched from Cumberland House, in the spring of the year 1820. The specific appellation will, it is hoped, be considered a proper compliment to the individual who has so often been quoted in these notices; in affixing his name to an American bird, it is proposed to record the renown amongst naturalists, which that quarter of the world has acquired by his labours in Ornithology. The specimen, when extended, measures ten inches and a half in length; the bill is one inch and a quarter long, black, narrow at the base and slender, the whole of its length having a very slight general incurvation; the upper mandible is flattened and turned downwards a little at its termination, and covers the end of the lower mandible; the forehead and top of the head is a clear pale ash colour; from near the junction of the mandibles a narrow line on each side of the head passes through the eyes to the side of the neck, where it widens considerably, and is contained in a broad patch to the back; this mark is at first black, but after it has passed the eye about half an inch, it gradually becomes a very deep chestnut; the chin and sides of the head between the above line are white; the neck is dingy white, slightly tinged with chestnut, darker near to the edges of the above patch; the belly and all the under parts are white; at the back of the neck is a white line between the two dark markings described above; the back and scapulars are dark ash colour, in which some few chestnut feathers are mixed; these are so disposed as to have an appearance of an irregular continuation of the dark chestnut patches on the sides of the neck; the whole of the wing feathers and upper coverts are dark ash colour, the large coverts and secondaries very slightly edged with white; under coverts of the wings white; the two middle tail feathers ash colour; the others the same on their outer web, having the inner mottled with ash colour and white; upper tail coverts ash colour; under tail coverts white; the

legs are black, naked near an inch above the knee ; the tarse an inch and a quarter long, sharp, with a membrane before and at the back ; the three fore toes lobed, with small curved black claws ; the centre toe the longest, and united at the base for a short distance to the outer ; hind toe three-eighths of an inch long and membranous. The specimen has much the appearance of being in its breeding dress, and having its plumage of that state nearly complete ; the irregular disposition of the chestnut feathers on the back leads to a supposition, however, that some further change was wanting to make that part perfect. From the character of the feet and the general figure of the bird, it is decidedly allied to the Phalaropes, and is consequently placed in that genus. M. Cuvier, in his *Règne Animal*, separated the two only species then known into two genera, Phalaropus and Lobipes ; there is a marked difference in the bills of the two birds which will certainly justify their separation ; and if they are to be divided, the present bird, being intermediate between them, will not perhaps agree sufficiently to be united with either, thus a third genus must necessarily be created ; but in this publication, it appears most expedient to consider all as belonging to one genus.

Podiceps Rubricollis. Red-necked Grebe.

Though the various writers on Birds have noticed the Red-necked Grebe and its European habitats, especially that it has occasionally been killed in Great Britain, none of them has mentioned it as a native of North America ; the writer of these memoranda had received specimens of it from Hudson's Bay, before the specimen sent home by Captain Franklin was put into his hands. Wilson has not given an account of any one Grebe in his work, but though some species are sufficiently common to the southwards, yet it is probable that this does not reach far below Canada. The specimen under description is fine, and seems to have been taken from a mature individual. It measures twenty-eight inches in length ; the bill from the opening of the mandibles is two inches and a half long, the upper mandible black, the lower horn colour ; the top of the head is a deep black, which is continued, though it is less intense, along the back of the neck to the back, which with the whole upper parts is dark brown, the throat and lower half of the neck from the lower mandible to the extent of about two inches and a half are a very pale drab colour ; this abruptly terminates in a ferruginous marking which occupies the whole of the neck except the back part, and spreads over the breast, but it is lighter and more glossy in this lower part ; the under parts are a glossy white as in most other Grebes ; the secondaries of the wings are white. It is the Jon-gris of the *Planches Enluminées*.

Podiceps Carolinensis. Pied-bill Grebe.

This species is confined to America, and is the Colymbus Podiceps of Linnæus. All that has hitherto been published respecting it has been derived from Catesby's figure

and account. It comes to New York and the Southern States in the autumn, and leaves them again in April; its migration is consequently from the North, and the specimens now received indicate the countries in which it breeds and passes the summer. The specimen to be described is supposed to be that of a male; it measures seventeen inches, including the length of the legs; the bill is short, and the upper mandible hooked, not straight, as is usual in the Genus; round the centre of both mandibles is a broad band of black; under the chin is a conspicuous and strongly contrasted patch of black, which is said to be wanting in the females; the upper parts are dark brown; the rest of the throat and cheeks is light brown; on the breast a patch of the feathers is minutely dotted or sprinkled with black and white; the belly is also mottled light brown and white; the secondaries of the wings are tipped with white.

Podiceps Cornutus. Horned Grebe.

There are two species of Grebe, having their heads full of dark feathers, with tufts of a bright colour over their eyes, which, though different, have caused some difficulty to naturalists in distinguishing them from each other. These are the P. Cornutus, and the P. Auritus, or Eared Grebe; both are found in Europe, but the former only is native of North America; it breeds in the countries round Hudson's Bay, and retires southward for the winter. It has been stated that on account of the expertness with which this bird dives, that it is peculiarly called by the Americans, the Water Witch; but that appellation is probably given to all the Grebes indiscriminately, the power of rapidly retiring under water, being equally possessed by them all. The Horned Grebe has been figured in the *Planches Enluminées*, as La Grebe d'Esclavonie, whence it is sometimes called by writers the Sclavonian Grebe, and it is generally known by that name among British Ornithologists. In its state of adolescence it has been called the Dusky Grebe, (Podiceps Obscurus;) it is then without any of the brilliant plumage of the mature bird, which also is frequently found in a less perfect state than in the specimen now under notice. Length, including the extent of the feet, seventeen inches; the bill is one inch long, dark, with the tip white; both mandibles are bent towards each other so as to meet in a point, which circumstance will be found an unerring mark of distinction between this species and the Eared Grebe; the upper mandible in that bird is straight, whilst the lower mandible is bent upwards to meet its point, giving the whole bill an appearance of being curved upwards; the head is covered with a thick coat of glossy black feathers, except, that from the upper mandible a patch of feathers of a chestnut red proceeds towards and above the eye; these are short, but the continuation of this marking beyond the eye, consists of elongated feathers, forming a tuft on each side of the head, proceeding about an inch and a half in length in the direction of the neck; these tufts near the eye are pale ochreous,

increasing in depth of colour, and becoming chestnut towards the other end, at which a few black feathers are intermixed; the black feathers of the head are continued along the back of the neck, becoming towards the back dark brown, which is the colour of the whole back; the neck, breast, and sides under the wings quite to the tail are deep chestnut; the belly is glossy white, the primaries dark brown, and the secondaries white.

Sterna Arctica. Arctic Tern.

The Common Tern of the Polar and Northern Seas, was supposed to be the Sterna Hirundo, and as such was described by Captain Sabine, in his account of the birds of Greenland, noticing however the remarkable difference between the specimens he obtained, and the Common European Tern, in the length of the bills and legs. M. Temminck, on his visit to England in 1819, received specimens of the northern Tern, and in the second edition of his *Manuel* described them as a new species. The Terns brought from the Polar Seas in the second voyage, as well as a specimen sent home by Captain Franklin, have the same characters; it is, therefore, probable that these alone are natives of the more northern seas, and that the Sterna Hirundo lives only in more temperate latitudes. M. Temminck states that the specimens he received, corresponded with those killed in Scotland and on the English shores; this surely must be a mistake, for the Arctic Terns have not, it is believed, been ever found on the British coast. Captain Sabine, in the Appendix to Captain Parry's Voyage, has described the immature plumage with which M. Temminck was unacquainted. The Arctic Terns may always be distinguished from the Common Tern by the length of their tarse; which is not more than half an inch in the former, whilst in the latter it is near an inch long; the bill of the Arctic Tern is shorter and the tail somewhat longer; there are also some smaller points of difference noted by M. Temminck. The Sterna Hirundo, figured and described by Wilson, is probably the bird to which that name is properly applied, though his account differs in some points from the European bird; he has omitted to give the length of the legs and bill of his Sterna Hirundo, which is necessary to the identification of the species, which must remain unsettled until a specimen, or further particulars, can be obtained from the United States.

Sterna Nigra. Black Tern.

The specimen received is in perfect summer plumage; the head, neck, and whole under parts, except the abdomen, are sooty black; the abdomen and under tail coverts pure white; the back, tail, and upper part of the wings dark ash colour; the under parts of the wings light ash colour; wings exceeding the tail about an inch in length; the tail slightly forked. In winter the under parts become white.

In the perfect breeding plumage it has hitherto been called Sterna Fissipes; in its winter dress it is the Sterna Nigra of Linnæus and others; and the young birds, under the supposition of their being different, have been called Sterna Obscura, or the Brown Tern. M. Temminck has adopted Nigra as the specific name, in preference to Fissipes. The Black Tern is not noticed by Wilson.

Larus Argentatus. Herring Gull.

The Herring Gull has been called Larus Fuscus by some writers, but the true application of that name is to the Lesser Black-backed Gull of Montagu. The specimens of this species killed in Greenland and the Arctic Seas, have, in almost every instance, the primary feathers of their wings without the black markings towards their ends, which distinguish these birds in other countries; the northern birds have nevertheless been considered as the same species. Captain Sabine, in his account of the birds seen in his first voyage, yielded his opinion on this point to the authority of M. Temminck. The specimen now under consideration, as well as others which have been received from Hudson's Bay, have the primaries marked as commonly described; so that it seems the singular variations in this change of colour in the feathers of the wings does not extend beyond the very cold regions of the north. If they are varieties, it will be desirable to distinguish them by calling the one, the Silvery Herring Gull, and the other, the Black-winged Herring Gull.

Larus Tridactylus. Kittiwake Gull.

This species abounds in Hudson's Bay. The specimen received is of an immature bird. Kittiwakes have been more generally called Larus Rissa, when in their perfect breeding plumage; whilst Larus Tridactylus used only to be applied to them in their younger state, in which they are known to the English Ornithologist as Tarrock Gulls. The name of the immature bird has, however, superseded the older specific name; it is very appropriate, as distinguishing the particular character of the species, that of being destitute of the hind claw.

Larus Atricilla. Laughing Gull.

This bird is published in the ninth volume of *Wilson's Ornithology*, under the name of Larus Ridibundus, which name certainly does not belong to it, for his description so well accords with the bird sent home by Captain Franklin, as to leave no doubt that it was made from a specimen similar to that now before us, which cannot be referred to the true Larus Ridibundus. As there are differences between the authors who have noticed the Larus Atricilla, a description of this species seems necessary. It is near seventeen inches long to the end of the tail; the bill is near an inch and a half long, bright orange red; the feathers extending far beyond the junction of the mandibles,

the upper mandible much curved, the lower with a projecting angle underneath; the whole head covered with a sooty black, extending lower on the fore part of the neck than on the back; a small white spot round the eye; the rest of the neck, and behind, to the junction of the dark feathers of the back, white; the back, belly, and sides, white, suffused with a delicate rosy tinge; the back wing coverts and scapulars, dark ash colour; of the primaries, the first has the outer web black, and the inner white, with a black spot two inches from the end; the second has the outer edge above ash colour, with about two inches and a half towards the end, black; the inner edge white, with a large spot of black below, and the tip white; the third and fourth are nearly similar, but with less black below, and more ash-coloured above; the fifth has only a small spot of black across it, just above the white tip, and the sixth has no black on it at all; the secondaries and tertials are ash-coloured, tipped with white, the former having more white than the latter; the rump and upper tail coverts, which are long, are white; the tail ash-coloured, and short, the wings extending an inch and a half beyond it; the under tail coverts white; the legs naked above the tarse; the tarse an inch and three-quarters long; the feet small, the centre toe, which is the longest, not exceeding an inch and a half. The above description, except that it is more in detail, agrees with the bird in Wilson, but his figure represents the primaries as entirely black. M. Temminck, who refers to Wilson's bird as his L. Atricella, makes it only fourteen inches long, and describes the primaries as black; all the rest of his description accords with the bird under examination. Pennant, who followed Catesby, and both these writers are also quoted by M. Temminck, describes his L. Atricella as eighteen inches long, and with the ends of the primaries black. There is little doubt but that the Gull above-described by these American authorities is the L. Atricilla of Linnæus, and that our bird is referable to that species; but it differs from that of M. Temminck in its size, and the colour of the primary feathers.

Larus Minutus. Little Gull.

This species has not been hitherto recorded as a native of the New World; it is abundant in the northern dominions of Russia, both in Europe and Asia, and is occasionally met with in the more southern parts of Europe. The specimen received, exactly accords with M. Temminck's description of the young bird of the first year; that figured by Montagu in the *Appendix of the Supplement to the Ornithological Dictionary*, though immature, is in a more advanced state of plumage, and was probably killed in the winter, the one now before us having been obtained in the summer. When mature, the Little Gull has its tail, and the primary feathers of its wings white, not tinged with black as in its adolescent state; the head becomes entirely black, changing, in accordance with all the other known Gulls, whic haveh black heads, to white in winter, resuming its dark feathers in the breeding season.

M. Temminck has decided that the Larus Atricilloides of Falk is referable to this species.

Lestris Parasiticus. Arctic Lestris.

Specimens in mature plumage, and with the under parts white, were brought home by the Expedition. This species is subject to much variation of plumage in its progress from youth to maturity; these changes are described, and the synonyms of various authors enumerated, in Captain Sabine's Memoir on the Birds of Greenland. Individuals apparently perfectly mature, corresponding to the specimens now before us, but having their under parts of a light brown, are frequently met with; it is difficult to account for this diversity of colour; M. Temminck supposes that only the older birds have white breasts, and that the darker hue of the under plumage is a proof of immaturity; but the birds so marked are said to be found at the breeding-places, and we know of no instance of such a marked difference between individuals of any species of the same sex, and living in the same districts, which have attained the age at which they are capable of producing young.

Anas. Swans. Geese. Ducks.

Of this extensive genus, a very large portion are common to the Old and New Worlds; their power of flight renders their passage from America, and the lands of the Polar Seas to the continent, and contiguous islands of Europe, easy. They come in winter to these countries in quest of food, and return in spring to the more solitary regions of the north, to rear their progeny. Some species, however, which are inhabitants of the north, do not migrate so far, and are confined to America alone. The birds, which are common to the whole north, are so well known, and have been so perfectly described by the various systematic writers, that an enumeration of the names of the species will be a sufficient notice. Specimens of the following were received:—

A. Fusca, - - - - - - - Velvet Duck.
A. Boschas, - - - - - - Mallard, or, Wild Duck.
A. Ferina, - - - - - - - Pochard, or, Red-headed Wigeon.
A Marila, - - - - - - - Scaup.
A. Clypeata, - - - - - - Shoveller.
A. Acuta, - - - - - - - Pintail, or, Sea Pheasant.
A. Crecca, - - - - - - - Common or Green-winged Teal.

The following species, which are found in different parts of the northern hemisphere, are not confined to America alone.

A. Cygnus, - - - - - - - Wild Swan.
A. Hyperborea, - - - - - Snow Goose.

A. Segetum, - - - - - - Bean Goose.
A. Albifrons, - - - - - - White-fronted Goose.
A. Leucopis, - - - - - - Bernacle Goose.
A. Bernicla, - - - - - - Brent Goose.
A. Mollissima, - - - - - - Eider Duck.
A. Spectabilis, - - - - - - King Duck.
A. Strepera, - - - - - - Gadwall.
A. Nigra, - - - - - - - Scoter.
A. Fuligula, - - - - - - Tufted Duck.
A. Clangula, - - - - - - Golden Eye.
A. Glacialis, - - - - - - Long-tailed Duck.
A. Histrionica, - - - - - Harlequin Duck.

Several of the birds above enumerated have been described under different names; occasioned by remarkable variations in the plumage of the sexes, or of the young birds from their parents, but it is believed that the above twenty-one species are all which can correctly be considered as common to Europe and America.

Of the birds belonging to the genus which are found in Hudson's Bay and its vicinity, but which do not visit or live in any part of Europe, there are eight species; specimens of six of these were brought home by Captain Franklin, and are subsequently particularized; the remaining two are:—

A. Canadensis, - - - - - - Canada Goose.
A. Labradoria, - - - - - - Pied Duck.

These are both described and figured by Wilson; the former is well known in menageries in Europe, and is frequently kept in a half-domesticated state, on large pieces of water and lakes, but though frequently shot when apparently wild, has probably in all such cases strayed from its adopted home; since none of the species has been traced in a state of migration.

Exclusive of the birds above-mentioned, and described below, there are other species known in America, but as they do not go so far north as the countries visited by the Expedition, it is not considered necessary to include them in these notices.

Anas Perspicillata, Black or Surf Duck.

M. Temminck has introduced this bird into his *Manuel* as having been occasionally though very rarely seen in the Orkneys and in high latitudes in Europe. As it has not, however, been mentioned as a British bird by any English author, nor included in any published list of the visitors of the British Islands, the circumstance of its ever having been obtained in the Orkneys seems to require confirmation, and therefore it has not been here considered as one of the species common to Europe and America. The Black Duck is frequent in the northern parts of the New World, it is smaller than

the Velvet Duck, but, like that bird, is chiefly black, with the exception of two conspicuous triangular white spots on the front and back of its head, separated from each other by a space more than an inch and a half broad, which is black ; the bill is remarkably irregular in shape, of an orange colour, much elevated at the base, with black patches on each side near the head. The specimen received is that of a male, and measures twenty-four inches in length, which is considerably more than has been assigned as its length by any writer. The female is said to be dark brown, and not to have the markings on the head, though that part of its plumage is lighter than the rest, and the bill has no prominences similar to those of the male.

Anas Vallisneriana. Canvas-back Duck.

A male specimen of the celebrated Canvas-back Duck was received. It is represented by the American epicures as being much superior in flavour to any other known duck. Wilson has given descriptions of both the male and female, and his figure, though small, is tolerably correct. It comes to the waters connected with the Chesapeake in October, and continues within the tides, but not in the salt waters, feeding on the Vallisneriana Americana which is abundant there. It continues in these quarters during the winter, and returns to the north to breed. It is also called in America the White-backed Duck and the Sheldrake. Before Wilson noticed the bird we had no distinct account of it. It has probably been confounded with the Anas Ferina or Pochard, which it resembles, but is considerably larger, being on an average two feet long, whilst the Pochard never exceeds twenty inches. The bill of the A. Vallisneriana is two inches and a half long, of the A. Ferina two inches ; the head and neck of the Pochard are all bright chestnut ; the upper part of the head in the other bird is dark brown, and the chestnut colour is confined to the lower part of the head, cheeks, and neck ; the black on the breast, which extends round the neck next the back, is the same in both species ; the upper and under parts of the body have the same beautiful fine undulation of dark grey, but the whole pencillings, as well as the ground colour, are darker in the Pochard than in the Canvas Back ; on the whole, the two birds are so very much alike, that a comparison of specimens can alone establish a distinction between them, which must, however, be considered as certain if it depended only on the difference in the bills ; the Pochard being native of America puts the matter further beyond question. Wilson, in describing this latter bird, was uncertain whether he was correct in referring it to the European Pochard, but a comparison of a British specimen with the American has made the identity unquestionable.

Anas Americana. American Wigeon.

These birds breed in the neighbourhood of Hudson's Bay in the spring, and go southward in the winter, even so far as the West-India Islands. Wilson mentions that they are constant attendants on the Canvas-back Ducks in the Chesapeake, feeding on the same aquatic plant, which the latter birds detach from the bottom of the waters by diving, but are robbed of it on the surface by their more active companions. According to Wilson, the American Wigeon has the name of Bald-pate in the United States, and Pennant states that one was received from New York as the Pheasant Duck ; but, perhaps, this was one of the usual names of the A. Acuta improperly applied. This species has a very general resemblance to the Common Wigeon of Europe, A. Penelope ; the top of the head in both, when mature, is cream-coloured ; the neck in the European is bright ferruginous ; and in the American is principally marked with specks and undulations of black or dingy white, with rich glossy black and green lines passing from each eye backwards, which meeting on the back of the neck extend as far down as the undulating markings on the rest of the neck ; the sides under the wings in the European have the same pencilled-marked feathers as the back ; the belly only being white, but in the American both sides and belly are white. The specimen received was of a male in the autumnal change, when it has not the light spot on the head, nor the other parts of the plumage so brilliant or distinctly marked. Wilson describes the two middle feathers of the tail as an inch longer than the others, but this is not the case in the specimen which has been under observation.

Anas Rubidus. Ruddy Duck.

Wilson has given figures and accounts of both male and female of this curious and rare bird, but the figures are too small for satisfactory information ; he had never seen more than two individuals, which he described, and which were killed on the River Delaware. The specimen received was that of a male, and is peculiarly valuable and interesting, because it not only confirms the species as introduced by Wilson, but ascertains its summer habitation to be in the northern parts of America. Wilson's work being in very few hands, and the subject, from its novelty and rarity, being of importance, it seems desirable to add his description of both sexes, the extreme correctness of which, as far as regards the male, is confirmed by the specimen ; the only point of difference is in the length, which, according to Wilson, is fifteen inches and a half, and that under notice near eighteen inches. The descriptions of the male are as follows :—" the bill is broad at the tip, the under mandible much narrower, and both of a rich light blue ; nostrils small, placed in the middle of the bill ; cheeks and chin white ; front, crown, and back part of the neck down nearly to the back, black ; rest of the neck, whole back, scapulars, flanks, and tail

coverts, deep reddish-brown, the colour of bright mahogany; wings plain pale drab, darkest at the points; tail black, greatly tapering, containing eighteen narrow pointed feathers; the plumage of the breast and upper part of the neck is of a remarkable kind, being dusky olive at bottom, ending in hard bristly points of a silvery grey, very much resembling the hair of some kinds of seal skins; all these are thickly marked with transverse curving lines of deep brown; belly and vent silver-grey, thickly crossed with dusky olive; under tail-coverts white; legs and feet ash-coloured."

He describes the female as "partly of the same size as the male; the front, lores, and crown, deep blackish-brown; bill as in the male, very broad at the extremity, and largely toothed on the sides, of the same rich blue; cheeks a dull cream; neck plain dull drab, sprinkled about the auriculars with blackish; lower part of the neck and breast variegated with grey, ash, and reddish-brown; the reddish dies off towards the belly, leaving this last of a dull white shaded with dusky ash; wings as in the male; tail brown; scapulars dusky-brown thickly sprinkled with whitish, giving them a grey appearance; legs ash."

The whole plumage is certainly very singular, the neck in the specimen appears to be very thick, the bill is particularly broad, the body thick, and the tail is remarkable in the feathers being so very narrow.

Anas Albeola. Buffel-headed or Spirit Duck.

This species is common in the United States in winter, and equally abundant in the north during the breeding season. It has received a variety of appellations, and the difference between the sexes has added to its names, since they have been taken for distinct species. Both sexes are well described by Latham in his Synopsis. Specimens of a male and female were received. The male is the A. Albeola and A. Bucephala of Linnæus, the Little Black and White Duck of Edwards, the Sarcelle blanche et noire ou La Religicuse and Petit Canard à grosse tête of Buffon, the Buffel-headed Duck of Catesby, the Spirit-Duck of Pennant, and is known to the Canadian settlers also as the Conjuring Duck. The female is the A. Rustica of Linnæus, the Sarcelle de la Caroline of Buffon, and the Little Brown Duck of Catesby, Latham, and Pennant.

Anas Discors. Blue-winged Teal.

Two specimens, both males, differing a little from each other, and marked as killed at Carlton-House, and there called the Shoe-string Duck, were received: these have not their heads and necks so dark as are described by authors, nor do the description of authors generally agree. The female is said to differ from the male by being generally brighter, and in not having the white mark in the head, but the bright

colours of the wings are the same in both sexes. Catesby made the two sexes distinct birds, calling the male the White-faced Duck, and the female the Blue-winged Teal; hence the different names of the writers who followed Catesby. Buffon called the male Sarcelle Soucrourou, and the female Sarcelle Soucrourelle. Linnæus brought the two birds of Catesby together, making them the male and female of his Anas Discors. Latham supposes these birds do not go higher than New York, but they evidently breed in the more northern parts, passing the United States in the spring and fall, and going for the winter to the West Indian Islands, Cayenne, and other warm countries of the south. They are excellent as food. Catesby describes the females of both his birds as being all brown; if he ever saw such, they were probably young birds. The male bird may be described from the present specimens;—length, sixteen inches; bill an inch and a half long, dark slate colour; between the eye and the bill, but separated from each by dark feathers, is a semi-lunar spot of white, the points turned backwards; the head and neck otherwise dark brown; the lower part of the neck, breast, and whole under parts marked with round black spots on pale reddish ground, the spots sometimes running together into bars; sides of the vent white; the under tail-coverts black; feathers on the back, dark brown, edged with very light brown narrow markings; primaries and tail feathers dusky brown; lesser wing-coverts bright shiny blue; below these a white band; speculum a brilliant green; tertials, some having one edge light blue, others striped with pale brown down the centre, otherwise dark brown; tarse one inch and a quarter long; legs and feet yellow.

Anas Sponsa. Summer Duck.

This species, though not included in the preceding enumeration of American Ducks which are found in the more northern parts of the New World, is here introduced, because it appears by a drawing made by Lieutenant Hood, at Cumberland-House, in May, 1820, to have been a visitor so far northward at that period.

Mergus Serrator. Red-breasted Merganser.

Specimens of two male birds were received. Few birds are more common or better known at Hudson's Bay than the Red-breasted Merganser, they breed there and migrate to the southward in the winter, at which season they are also common in the United States, and have been well described by Pennant and Wilson. They are equally well known in Europe.

Mergus Cucullatus. Hooded Merganser.

A specimen of a female of this species was brought home by the Expedition; it agrees exactly with the description of Latham and Pennant, who represent it as breeding, and being plentiful, in the countries round Hudson's Bay.

Colymbus Glacialis. Great Northern Diver.

This bird has been long well known, except that in its immature state it has been called Colymbus Immer, and the Immer Diver. It is found in the northern countries of both worlds, breeding and living on the sides of lakes, and going southwards in severe weather, where it is equally observed on the sea, and in fresh waters. These birds differ much from each other in size, which has led Wilson to conjecture that there may be two species, the smaller belonging to America; but this cannot be the case, since specimens have been received from Canada, as large as any killed in Europe.

Colymbus Septentrionalis. Red-throated Diver.

This species, though spread over the whole Arctic Regions, is particularly abundant in Hudson's Bay, and in the lakes in the interior. It is a more northern bird than the Northern Driver, is found nearer to the Pole, and goes less to the south. The young are much more plentiful in the temperate counties in the winter than the old birds. It is subject to great variety in size, the length being sometimes twenty-one inches; in other cases, twenty-eight inches. The young have been called Colymbus Stellatus, Striatus, and Borealis; Speckled Diver and Striped Diver. Buffon mistook it for the female of the Black-throated Diver; and did not, therefore, make it distinct. It is not noticed by Wilson in his *American Ornithology.*

No. VI.

NOTICES OF THE FISHES,

BY

JOHN RICHARDSON, M.D.,

SURGEON TO THE EXPEDITION.

IN the following pages I have been led to give much more detailed descriptions of some of the fish, observed by the Expedition, than may at first sight appear to be necessary; because I wished to put Ichthyologists in possession of as many facts as I could, respecting species which may not soon come under the notice of another observer. I was also desirous of enabling those who are versant in this branch of Natural History, to decide whether they may, or may not, have been already described by other authors; a point on which my own opinion is of little value. The descriptions were, except in one or two instances, which are noted, taken upon the spot, from recent specimens. The disadvantages under which we frequently laboured in doing this, will be apparent to those who have read the Narrative of the Journey; and will, I hope, be esteemed a sufficient excuse for diffuseness on the one hand, and omissions on the other.

Petromyzon Fluvialis, L. Lesser Lamprey.

A lamprey, bearing an exact resemblance in size and appearance to the one figured by Bloch, t. ccccxv. f. 2., under the name of P. argenteus (and which Cuvier, *Règ. An.* tom. ii, p. 118, considers to be the same with P. fluvialis,) was found in Great Slave Lake, adhering to an inconnu, (salmo Mackenzii). It had the large eyes, and, comparatively, large mouth, represented in Bloch's figure, with the teeth of the P. fluvialis. The size of its eyes would seem to mark it as a young fish.

Accipenser Ruthenus. Sterlet.

Cuvier Règ. An. ii. *p.* 142. *Gmel. Lin. Syst. Nat.* p. 1485. *Bloch,* t. 89.
Pennant's Arctic Zoology, ii. p. 358.
Accipensère Strelet, *Lacepede,* tom. i. p. 434.

This fish, termed nameyoo by the Cree Indians, is caught in great abundance in the Saskatchawan, but is not known to exist in the more northerly rivers, that

discharge their waters into the Arctic Sea. The sturgeon fishery at Cumberland House is most productive in the spring and summer, but some are caught occasionally in the winter. Considerable differences in the intensity of the colour of the body, and in the length and acuteness of the snout, exist amongst the individuals caught there, but they seem to be all referable to this species. A fish of sixty pounds weight is esteemed to be large. To the westward of the Rocky Mountains sturgeons, weighing several hundred pounds, are common. These are probably of the species A. huso, *L.* The sturgeon, in the Saskatchawan, generally spawns in June, but individuals are found at all seasons containing roe.

Salmo Hearnii. Copper-Mine River Salmon.

Sub-genus salmo, *Cuv. Règ. An.* ii. p. 160.
Salmo, maculis carneo-rubris, squamis parvis multum nitentibus, maxillis æqualibus, caudâ integri.

Shape, that of the common salmon, but the head rather larger in proportion.

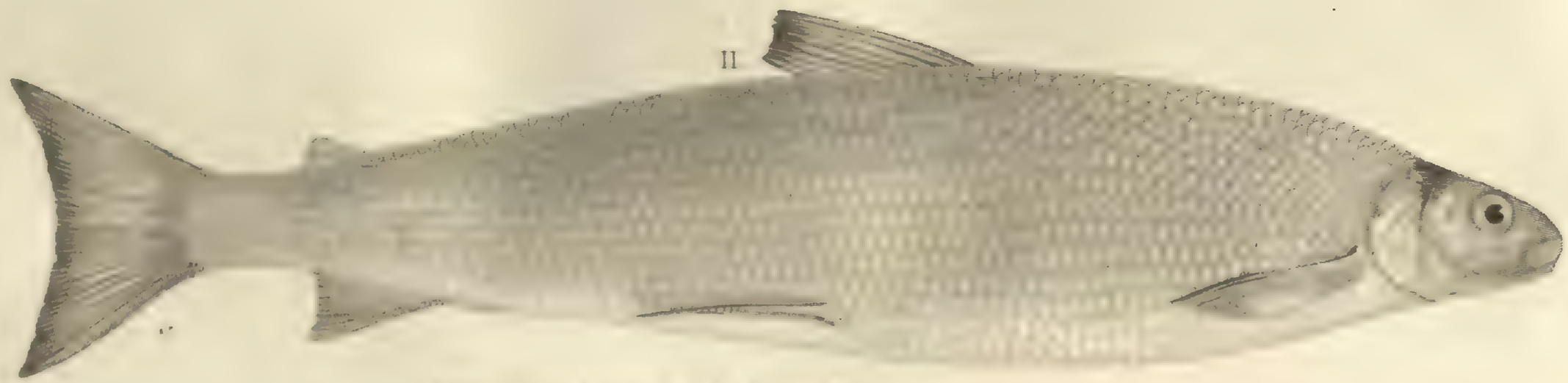
The *colour* of the back is olive green, of the sides pale, of the belly bluish white; and there are several longitudinal rows of flesh-red spots, of which those on the sides are largest, and about the size of a pea.

The *scales* are very small, but possess much lustre, and adhere very firmly to a mucous skin.

The *head* is destitute of scales. The cheeks are unprotected by bone, but, together with the opercula, have much pearly lustre. The eyes are small, and situated about half an inch from the middle of the margin of the mouth. The nostrils are double, being composed of two small evalvular openings on each side, which are placed superiorly and anteriorly to the eye, or about half way between that organ and the mouth. The jaws are of equal length; the upper one is emarginated, and receives the knobbed extremity of the lower one into the notch.

Mouth.—The intermaxillary bones project a little to form the snout, but enter only, in a small degree, into the composition of the margin of the mouth, The snout thus formed, is separated from the vault of the palate by a thin membrane, which arises from the maxillary bones, lies in a plane parallel to that of the palate, and has its crescentic edge directed towards the pharynx. The maxillary bones are oblong, and form the sides of the upper jaw; their lower extremities play upon the outside of the inferior jaw. The limbs of the lower jaw meet in an acute angle, and form a knob at the symphysis.

Teeth.—The upper and lower maxillaries are furnished sparingly with small subulate teeth. A solitary tooth, similar to these, is placed on each side of the notch, formed by the intermaxillaries. There are also rows of teeth on the palatine bones, and a few on the anterior part of the vomer, and some stronger ones on the tongue, all subulate.



J. Curtis del. [and sculpt.]

Published March 1823. by John Murray, London

The *gill-openings* are large, and the branchial arches unite nearly at the mœsial line of the tongue. There are ten oblique rays in the branchiostegous membranes.

The *intestines* are similar in form to those of the trouts. The stomach is rather small. The cæca, from thirty to thirty-six in number, are simple, cylindrical, and from one to two inches long.

Fins.—The dorsal fin is situated opposite to the ventrals. The anal fin is triangular with the apex of the triangle truncated; it has eighteen rays. The caudal fin is large and very entire, truncated with a slight rounding of the angles, and entirely devoid of a crescentic form. Its outline is wedge-shaped.

This fish is inferior to the English salmon in size, its flesh is red, and it is taken in great abundance in the months of July and August, in the Salmon Leap, at Bloody Fall, on the Copper-Mine River.

We have compared it with the descriptions of the various species given in Pallas' *Itin.*; and with the plates of those indicated by Cuvier, *Règ. Animal*, ii. p. 162, from all of which it appears sufficiently distinct. It resembles the S. Eriox in its caudal fin.

Salmo Mackenzii.

Inconnu, *Mackenzie's Voyages in North America*, p. 9, *and elsewhere, and of the Canadian Voyagers.*

S. corpore sub-tereti elliptico-lanceolato, capite longo: rostro truncato, ore dentibus parvis confertis munito, maxillâ inferiore longiore.—Tab. XXV. Fig. 1.

Body roundish: lateral outline betwixt elliptical and lanceolate, tapering towards the tail. *Lateral line* straight.

Colour of the back and sides changing from bluish to greenish-grey when it is moved in the light: of the belly bluish-white.

Scales sub-orbicular, four lines in diameter, possessing much pearly lustre.

The *head* is long and compressed, but a little flattened above. The vertex is covered with smooth skin. The mæsial line rises into an acute smooth ridge betwixt the orbits. The orbits are oval and large—they are placed about an inch from the extremity of the snout, or twice as near to it as to the posterior edge of the operculum. The sides of the head have a strong silvery lustre. The operculum and sub-operculum form, by the junction of their smooth even posterior margins, a very regular segment of a circle rather greater than a semicircle. They form about one-third of the margin of the large gill openings, the remaining two-thirds being formed by the branchiostegous membranes. The pre-operculum has a lunated form, and leaves a small naked cheek not greater than its own breadth betwixt it and a double range of suborbitar bones. These sub-orbitar bones, about six in number, form a circular patch, the greatest part of which lies posterior to the orbit; a narrow thin plate, running out from them along the under margin of the orbit, again expands into

a radiated sub-orbicular plate on each side of the snout. The nostrils are double, very small, and placed close to the orbit. The anterior foramen, formed in the soft border of the posterior one, has a raised margin. The snout is immoveable, and truncated.

Mouth.—The intermaxillary bones, forming about one-third of the margin of the upper jaw, lie transversely, overlapping the curved articulating extremities of the maxillaries, and give a truncated form to the snout. The maxillaries are very thick and strong, are made up of two plates, have a lanceolate shape with smooth edges, and, when the mouth is shut, pass on the outside of, and cover the broad flattened sides of, the lower jaw. They send a small curved process behind the extremities of the intermaxillaries to be articulated through the medium of cartilage with the snout. The under jaw is strong, has an obtuse and very slightly tuberculated extremity, which projects four or five lines beyond the upper jaw. Its articulation, extending as far back as the posterior part of the orbit, admits of considerable depression, but the opening of the mouth is not of corresponding magnitude, as its sides are contracted by a tendinous or muscular fold, which runs from the middles of the superior maxillaries to the sides of the lower jaw.

Teeth.—The intermaxillary bones, the extremity of the lower jaw, the palate, vomer, and tongue, are covered with card-like plates of minute teeth. The same kind of plates occur at the root of the tongue, and on the superior and inferior pharyngeal bones.

The *branchiostegous membranes* contain ten flat curved rays, which increase considerably in breadth, and slightly in curvature and length, as they approach the operculum.

The *branchial arches* are furnished with solitary rows of rigid cartilaginous awl-shaped processes, whose inner surfaces are rough, with minute teeth. Those on the upper arch exceed half an inch in length; the others are smaller.

The *œsophagus* and *stomach* descend from the pharynx in form of a continuous tube, having nine longitudinal rugæ on its internal membrane. After running towards the anus for about three inches, this tube makes a short turn upwards, and terminates in the pylorus.

The *cæca* are very numerous, conical, or awl-shaped, and about a quarter of an inch long. They surround the intestine, and are much crowded from its commencement to the insertion of the gall-duct, a space of about two inches. Beyond this they are continued down one side of the intestine only for two inches more. The remainder of the gut descends naked in a straight line to the anus. About an inch and a half of the gut, a short way from the anus, is furnished with circular rugæ. The air-bladder is large, without contractions, and communicates freely with the upper part of the stomach, or lower part of the œsophagus. There is a large spleen attached to the curvature of the stomach.

Fins.—The dorsal fin is situated opposite the ventrals, and about its own length, nearer to the caudal fin than to the snout. It is sub-quadrangular, higher than long, and gradually diminishes in height posteriorly. It contains twelve rays, of which the first is three inches and a quarter long, and is supported anteriorly by three shorter ones closely applied to its base. The adipose fin is small and lingueform. The anal fin is sub-quadrangular, deepest anteriorly with a slightly crescentic margin. It occupies rather more than half the space between the anus and caudal fin. The first ray is supported by three minute ones. The caudal fin is large, forked, with the lower lobe very slightly larger than the upper one; the scales, a little diminished in size, encroach somewhat upon the fin, and terminate by a well-defined semicircular line.

B. 10. P. 17. D. $12\frac{3}{3}$. V. 12. A. $15\frac{3}{3}$. C. $22\frac{6}{6}$.

The length of the specimen described was eighteen inches, or, including the caudal fin, twenty inches and a half.

This fish grows to the size of thirty or forty pounds, or upwards. Its flesh is white, and when in season agreeable; but it is rather soft, and proves palling when used as daily food, differing in that respect from the attihawmegh. The Indians report that it comes from the Arctic Sea. We have no account of its being found anywhere except in M'Kenzie's River, and in the lakes and rivers which flow into it. Its most southerly *habitat* is at the Salt River, the cascades on Slave River preventing it from ascending higher. It agrees in some points with the descriptions given of the S. peled, S. leucitchys, *Nov. Com. Petrop.* xvi., and S. autumnalis, *L.*; but appears to be distinct from all these, not only from the differences in the number of the rays in the fins, but also in the teeth. This fish does not arrange well in any of Cuvier's sub-genera of the genus salmo.

Salmo Fario. L.

Sub-genus Salmo. *Cuv. Règ. An.* p. 161.
Namaycush, *Pennant's Arctic Zoology, Introd.* p. ccxcviii.
Namaycush, *Penn. Arc. Zool.* Vol. ii. p. 392.
Trout, *Penn. Arc. Zool. loco citato. Hearne and Mackenzie, passim.*

Among the trout, which abound in every lake and river in the northern parts of America, there exist innumerable varieties, differing in size and colours. The Indians have no names to denote the varieties, but class them all under one general term; the Crees under that of nammæcoos, the Chipewyans of thlooees-inneh, and the Esquimaux of œrkallook. I took descriptions of several of the varieties, but did not observe any difference of structure, whereupon I could found specific characters. The vividness of the spots seemed to change with the season, and with the condition of the individual; and the colour of the flesh, which varied from white to pale red, may also be ascribed to some accidental cause, perhaps to the river in which they

were bred. It is well known that the colours, both of the flesh and skin of the trout, in Scotland, bear a relation to the colour and nature of their native streams. On these accounts I have referred them all for the present to the above-mentioned species, leaving to those who are better acquainted with ichthylogy, and have greater opportunities of comparing the different kinds than we possessed, to discriminate them hereafter.

We frequently observed trout weighing forty pounds, and were informed by the residents that fish of sixty pounds were not very uncommon in particular lakes. In Manito, or God's Lake, between Hill and Severn Rivers, they are reported to attain the enormous size of ninety pounds. The large individuals that we saw, bore a striking resemblance to the overgrown trout that are occasionally met with in England. They are all, particularly the larger varieties, subject to an incurvature of the lower jaw when out of season, and at that time the teeth appear particularly prominent.

We caught a few trout in the Arctic Sea. They are found also in small land-locked lakes in every part of the country.

Salmo Grœnlandicus. Capelan, or Lodde.

Capelan. *Pennant's Arctic Zoology*, vol. ii. p. 394.
Salmo Groenlandicus. *Bloch.* 381, *f.* 1. Clupea Villosa, *Gmel. Linn.* p. 1409.
La Lodde. *Bonnaterre Planches de l'Encycl. Méth. liv* 28. p. 167.

This curious little fish termed by the Esquimaux angmaggœuck was met with in Bathurst's Inlet, collected in large shoals on the shallows to spawn.

Coregonus Albus. White Fish.

Genus. Salmo. *Lin.* Coregonus. *Artedi.* Sub-genus. Coregonus. *Cuv. Règ. An.* 11. p. 162.
Salmo Lavarettus, Guiniad and Tickomeg. *Pennant's Aretic Zoology, Introduction*, p. 298. and vol. ii. p. 393. (excluding the synonym of British Zoology.)
Coregonus Albus. *Le Sueur, Journal of Academy of Sciences, Philadelphia*, vol. i. 232, with a figure.

The Cree name of this fish is attihhawmegh, which is corrupted into tittameg by the traders. The Canadian voyagers term it poisson blanc. It is named thlooœh by the Copper Indians. The weight of an ordinary-sized fish is three pounds, but it is not uncommon to meet with individuals weighing eight pounds, and they have been known to reach even twenty pounds. When very fat the shape of the fish is somewhat distorted, as it acquires a hump immediately behind the head. The very large fish increase principally in circumference, their length suffering little augmentation.

The attihhawmegh seems to prey on insects. Its stomach, however, is generally filled with earth mixed with a few slender roots of vegetables and some small white

J Curtis del (ad nioc) et sculp

Coregonus signifer (Backs Grayling)

worms. It has been known, though rarely, to take a hook baited with a small piece of meat. The structure of its stomach displays in an eminent degree that peculiar thickness of coats which has been observed in many fish of this genus.

We caught some fine attihhawmegh at the mouth of the Copper-Mine River, and in Bathurst's Inlet, and it abounds in every river and lake in the country. It forms a most delicious food, and at many posts it is the sole article of diet for years together, without producing satiety. It spawns in the month of October.

Coregonus Artedi?

Gen. Salmo. *Lin.* Coregonus. *Artedi.* Les Ombres, *Cuv. Règ. An.*
Coregonus Artedi, or Herring Salmon, *Le Sueur, Jour. of Acad. of Sciences, Philadelph.* Vol. i. p. 231.

This fish bears so strong a resemblance to a lean individual of the preceding species, that it requires the eye of an experienced fisherman to detect the difference on a cursory view. It is, however, smaller in all its parts, and differs remarkably in the comparative thinness of the coats of its stomach, which are scarcely thicker than those of an ordinary trout.

The Cree name of this fish ottonneebees, has been corrupted by the traders into tullibee. It is inferior to the attihhawmegh as an article of food; but in its habits and food it appears to correspond with that fish, notwithstanding the difference in the structure of their stomachs. It is found in most of the lakes, and we caught a few in the sea at the mouth of the Copper-Mine River, but it is much more rare than the attihhawmegh.

Coregonus Signifer. Back's Grayling.

Gen. Salmo. L. Coregonus. *Artedi.*
Poisson bleu. or Blue fish, *of the Fur traders.*
C. pinnâ dorsali maxima: radiis posterioribus elongatis, maxilla inferiore longiore, corpore maculato.—Tab. xxvi.

The *body* has a compressed, elliptical form, tapering gradually towards the tail; the head is small, and the snout, seen sideways, appears acute, but otherwise obtuse.

The *lateral line* is very nearly straight, and nearer to the back than to the belly.

Colour.—Its sides are tinged with lavender-purple, mixed with bluish grey, without streaks; the belly is blackish grey, with several irregular white blotches, and there are five or six longitudinal rows of uniform quadrangular spots of Prussian blue on the anterior part of the body. There is a large blue mark underneath the lower jaw on each side. The dorsal fin, which forms a prominent feature in the fish, is of a blackish-grey colour, with some lighter blotches. Superiorly it has a narrow margin of light lake-red, and posteriorly it is beautifully ornamented with spots of Berlin blue. The ventrals are streaked with red, and whitish lines in the direction of their rays. The *scales* are moderately large, and have no great lustre; their exte-

rior margins are rotundate and entire, or very slightly undulated ; those on the anterior part of the belly are much smaller than the others.

Head.—The vertex is covered with smooth skin, which, shrinking, shews in the dried specimen a central obtuse ridge, and a lateral one over each orbit, better marked, but tuberculated and interrupted. These are inconspicuous in the recent fish. The operculum and sub-operculum form conjointly nearly a rectangle, having its posterior angles slightly rounded off. The inter-operculum is acutely triangular, and the præ-operculum, of a lunated form, unites with the sub-orbitar bones to cover great part of the cheek, a small fleshy portion occurring only over the angle of the lower jaw. The orbit is large and nearly round; it is above one-half nearer to the margin of the mouth than to the posterior edge of the operculum.

The *nostrils* are small, and placed between the anterior superior angle of the orbit, and the intermaxillaries.

The *mouth* is moderately large. The intermaxillaries, forming about a third part of the upper mandible, are narrow, and lie transversely, giving a truncated appearance to the snout when viewed from above. They are articulated with the maxillaries, which have also a narrow oblong form; and, when the mouth is extended, they form its sides, descending perpendicularly to be connected by membrane with the broad posterior part of the lower jaw; an oblong pedicle is attached to the posterior edge of each of the maxillaries. The lower jaw is large and strong, and has its articulation under the centre of the orbit; about one-half of it, when the mouth is open, projects beyond the upper jaw. Its symphysis, or extremity, is obtuse, forming the segment of a circle. When the mouth is closed, the maxillaries are retracted close to the orbit, the lateral margins of the lower jaw shut in under them, and a transverse slit only is seen, formed at the extremity of the muzzle, by the intermaxillaries, and obtuse end of the lower jaw.

Teeth.—A single row of small hooked teeth runs round the margins of the intermaxillaries, maxillaries, and lower jaws. A double row, rather more minute, exists on each side of the palate, and there is a small cluster on the anterior part of the vomer. These are all conspicuous in the dried specimen. The tongue is smooth; the superior pharyngeal bones are rough, with minute teeth.

The upper *branchial arch* is furnished with a row of rough subulate cartilaginous processes; there are smaller and softer processes on the other arches. The branchiostegous membrane contains eight flat rays, the inner ones becoming gradually more curved.

The *alimentary canal* descends from the pharynx for two inches and a half, in form of a straight tube, having its internal membrane disposed in coarse longitudinal rugæ; it then dilates considerably, and bends upwards upon itself. This dilated part resembles the stomach of the attihhawmegh in its structure, but its coats are

not so thick. The pylorus, which is much contracted, terminates the ascending part. The rest of the intestine runs downwards in a straight line to the anus; its coats are very thin, but two or three inches of its inferior part are strengthened by some circular rugæ of its internal membrane, and round its upper part seventeen or eighteen cæca, from one-half to two inches long, are inserted within the space of three-quarters of an inch. The liver is small, without lobes, and there is a large spleen attached to the lower curvature of the stomach. The air-bladder is large, and communicates with the œsophagus.

Fins.—The pectorals are scimitar shaped, and pointed, and reach rather more than half way to the insertion of the ventrals. The dorsal fin is probably by far the largest in this genus; it contains twenty-four rays: the two or three first are small, but the others, increasing rapidly in height, as their origin is more posterior, become more and more branched, and cause the fin to play loosely like a flag over the posterior part of the body; the insertion of the fin occupies about one-third of the length of the body, and the extremity of its posterior ray, which is five inches long, reaches as far as the adipose fin. The extraordinary size and beautiful colours of this fin form the great ornament of the fish. The adipose fin is tongue-shaped, about one inch long, and situate opposite the posterior edge of the anal. The ventrals are large, obliquely fan-shaped, and placed opposite the centre of the dorsal. The anal fin is rather small; it contains ten rays, besides two or three very short ones, which lie over the base of the first one; the others become shorter as they recede; a naked space, equal to the length of the insertion of this fin, is left between it and the tail. The caudal has a shallow crescentic form, the lower lobe being slightly larger than the upper one. Most of the fin is covered with very small scales, densely tiled.

B 8. P 17. D 24. A $10\frac{3}{3}$. V 9. C $20\frac{4}{4}$.

This beautiful fish inhabits strong rapids. Its stomach is generally filled with gravel, or black earth. It bites eagerly at the artificial fly, and, deriving great power from its large dorsal fin, affords much sport to the angler. Its rectum is filled with black fæces. The ordinary length of the species is about sixteen inches, exclusive of the caudal fin, or about twelve inches from the snout to the anus. As an article of food it is inferior to the attihhawmegh. It is found only in the clear rivers to the northward of Great Slave Lake.

In the figure, which is an accurate representation of the dried specimen, the posterior part of the fin is scarcely produced enough, owing to a portion of it having broken off in the carriage.

Coregonus Thymalloides. Little Winter River Grayling.

C. pinna dorsali magna radiis 22 equalibus, maxilla inferiore longiore, dentibus mandibulorum palatorum vomeris et pharyngis parvis.

This fish resembles the preceding in many points, and is caught in the same places. Their teeth and intestines correspond. They differ slightly in shape, colour, and lustre, but remarkably in the size of the dorsal fin. Its shades of colour are not so beautifully arranged as in the preceding, and are less vivid, but its scales possess more lustre.

Its *body* is compressed: its lateral outline broadly lanceolate, tapering gradually towards the tail. The belly is rather more obtuse than the back. Its sides are bluish grey, with some purplish reflections, when moved in the light.

The *scales*, partly orbicular and partly truncated, are of equal size throughout, moderately large, and possess a bright pearly lustre.

The *dorsal fin* is large, and like that of the preceding species, contains from twenty-two to twenty-four rays, but the posterior ones do not branch out in the same manner, and scarcely exceed the others in height; hence the fin has a very different aspect. It is about one inch high, has a dark bluish-grey colour, with several rows of spots, having purple centres and light-red borders. It has also several perpendicular opake whitish streaks. The other fins are the same with those of the C. signifer.

B 8. P 17. D 24. V 9. A 10. C 20.

The usual size of this fish is eight inches.

Coregonus Quadrilateralis. Round Fish.

Kathæh, *of the Copper Indians and* okeugnak, *of the Esquimaux.*

Sea Gwiniad. *Arctic Zoology, Introd.* ccxcviii. *vol.* 2. *p.* 393. *No.* 173, excluding the synon. of British Zoology.

C. rostro obtuso, maxilla inferiori truncata sub-breviore, ore omnino edentulo, pinnæ dorsalis radiis 11. Tab. xxv. Fig. 2.

Body.—Shape sub-fusiform. It is four-sided, with the angles rounded, and, when viewed laterally, presents a lanceolate outline, tapering towards the tail. Its form is elegant; the back is slightly arched, the belly still less so. Its depth, immediately anterior to the dorsal fin, is three inches, or about one-fifth of its length, and its transverse diameter, at the lateral line, is about two inches.

The *colour* of the scales on the back and sides is intermediate betwixt honey yellow and wood brown, with a thin border of blackish grey round their exterior margins. Those on the belly are white, and exhibit a pearly lustre.

The *scales* are large, being between three and a half and four lines in diameter, and have an irregular orbicular form, and much lustre.

Head.—The forehead runs in a straight line as far as the nostrils, from whence the obtuse but not broad snout droops suddenly. The mæsial line from the occiput

to the nostrils is raised into a slight ridge, and the sides of the head are rounded off. The opercula and infra-orbitar bones which cover a great part of the cheek are yellowish with metallic lustre. The eye is moderately large, and the anterior part of the orbit is half an inch from the extremity of the snout. The irides are yellowish white with a silvery lustre.

The *nostrils* are double and situated about five lines from the end of the snout. The posterior openings are rather larger: the anterior ones are surrounded by a soft membranous border.

The *mouth*, which is very small, is, when stretched to the utmost, nearly quadrangular, and has the broad extremities of the superior maxillary bones projecting on its sides; when shut it has the appearance of a transverse slit about a quarter of an inch in length, formed above by the intermaxillary bones, which descend perpendicularly from the snout, and below by the very obtuse symphysis or truncated extremity of the lower jaw. The superior maxillary bones are twice as large as the intermaxillaries, and the crura of the lower jaw form with their transverse symphysis three sides of a rectangle.

There are no *teeth* whatever.

The *branchiostegous membrane* contains seven rays. The branchial arches are furnished with single rows of small soft processes.

Intestines.—The œsophagus and stomach form one tube, which makes a curvature upwards for one third of its length, and terminates in a very contracted pylorus. It is not thickened like the stomach of the attihhawmegh. The rest of the gut runs in a straight line to the anus. The cæca are crowded round its commencement, and descend in two or three rows for one third of its length. They are in number between eighty and ninety. The lower third of the gut has its internal membrane disposed in circular rugæ, except about half an inch at the anus. The whole gut and cæca look black from the colour of their contents.

Fins.—The *dorsal* fin commences six inches and a half from the snout, is one inch and three quarters high, and has eleven rays exclusive of two short ones, which lie against the base of the first. The adipose fin is attached nearly its whole length, and has a few scales on its base. The ventrals are opposite to the dorsal. The anal fin has ten strong rays; a considerable portion of the tail, which is slender, lies behind it. The anus is eleven inches from the mouth. The caudal fin is slightly crescentic, its base is covered with scales. The fins have in general a yellowish tinge.

B. 7. P. D. 11. A. 10. V. C.

This fish preys on small insects. It spawns in September. We found it in the small rivers about Fort Enterprise and in the Arctic Sea. It occurs also in Hudson's Bay, and is well known to the Esquimaux about Churchill by the name of okeugnak.

The individual, from which the description was more particularly drawn up, was a male fifteen inches long from the nose to the caudal fin. It was selected as being of medium size, and there did not appear to be any difference in external form betwixt the sexes.

As this fish occurs abundantly in the places from whence Pennant received his *sea gwiniad,* and as no other fish answering to the description of the gwiniad is known to the traders, I have quoted him with doubt. The round-fish differs from the gwiniad of British Zoology in the number of the rays in all the fins, in the ventrals not being blue, and in the want of the deep blue spots on the belly. La Bezole, Rondelet, *sur les Poissons des Lacs*, p. 119, bears a strong resemblance to our fish, but the description there given is not sufficient to enable me to decide whether they are the same or not.

It also resembles the S. Wartmanni Bloch, t. 105, in form, but differs in the number of branchiostegous, dorsal, and anal rays.

Hiodon Clodalis. Gold Eye.

H. clodalis. *Le Sueur Journal of Academy of Sciences Philad.* 1. p. 367 t. 14.

This singular and beautiful fish, resembling in its habits the small trouts, is caught in nets at Cumberland-House in the spring, but not in sufficient quantity to be of importance in an economical point of view.

It is named oweepeetcheesees by the Cree Indians, and naccaysh and gold eye by the traders.

Clupea Harengus. L. Common Herring.

A pretty extended description of a herring, caught in Bathurst's Inlet on August 5th, has been compared with the common herrings brought to the London market in January, and found to agree exactly. The roe of the herrings we caught was very small.

Esox Lucius? Pike or Jack.

The pike abounds in every lake in the northern parts of America, and contributes much to the support of the Indians, as it is the only fish that is readily caught with the hook in the winter time; from which circumstance it has obtained the name of eithinyoo-cannooshœoo or Indian fish. The Hudson's Bay pike, referred in Pennant's *Arctic Zoology* to the common species, seems to differ from it in some respects; but without further opportunities of comparison, we cannot venture to pronounce them to be distinct.

Catastomus Hudsonius.

Grey Sucker.—*Of the English fur Traders.* Carpe Blanche, *Of the Canadian Traders.* Namaypeeth. *Cree Indians.*

Genus Cyprinus, *L.* Catastomus. *Le Sueur.* Sub-genus Leuciscus, Les Ables, *Cuv. Règ. Animal.* ii. p. 195.

Cyprinus Catastomus, *Forster Philosoph. Trans.* lxiii. p. 158. t. vi.

Namay-peeth and Sucker, *Pennant's Arct. Zool. Introd.* p. ccxcix. and vol. ii. 402.

Catastomus Hudsonius, *Le Sueur Journal of Acad. of Sciences, Phil.* vol. i. p. 107.

The body swells gradually from the head until it attains its greatest girth, about half way to the dorsal fin: from thence it tapers to the lower edge of the anal fin, and the remainder of the tail is nearly linear. Its sides and back are slightly flattened, the depth exceeding the transverse diameter rather more than one half. The *lateral line* runs downwards from the nape of the neck by the side of the gill-opening until it becomes nearly equidistant from the back and belly; it then runs straight towards the tail, and when it arrives over the anal fin, is reflected upwards at a very obtuse angle, thus giving to the tail a direction differing, though in a slight degree, from that of the body.

The *colour* of the back and sides is bluish-grey with a slight tinge of yellowish-red, and considerable lustre. The belly is pearly white. The thoracic and ventral fins are of an ochre-yellow colour tinged with red. The anal is flesh-red and the dorsal and caudal are bluish-grey.

The *scales* are for the most part broadly oval, or nearly orbicular and of a medium size. The uncovered portion of each scale is marked with radiated lines, corresponding to obscure crenæ on the edges, and has a transverse diameter considerably greater than the longitudinal one. The scales on the belly are smaller. They become larger towards the tail.

The *head* is smooth, flattened laterally and on the vertex, or it is sub-quadrilateral, convex before the eyes and ending in an obtuse snout. The breadth of the head at the occiput exceeds that of the shoulders, but it gradually decreases towards the nose. The operculum is nearly thrice the size of the sub-operculum; and it exceeds the other two bones of the gill-covers nearly in the same proportion. Their edges unite to form a smooth segment of a circle, which is edged narrowly with membrane. Various porous lines and tubercles are, as M. Le Sueur remarks, very evident in the dried specimens, but not conspicuous in the recent fish. The figure of Forster having been taken from a dried specimen, conveys on this account a very imperfect idea of the appearance of the head. The head is three times and a half as long as the body from the gill-openings to the caudal fin. The brain is protected by a piece of cartilage, which, on maceration or boiling, drops out, leaving a rectangular foramen in the cranium, one inch long and a quarter of an inch wide.

The *eyes* are oval and placed about their own length nearer to the gill-openings than to the snout.

The *nostrils* are double, and situated immediately anterior to the eyes. The anterior openings furnish small opercula, which exactly cover the posterior ones.

The *branchiostegous membranes* are united to each other by a plicated skin continuous with the integuments of the abdomen, but separated from them by a transverse shallow sulcus, and further distinguished by the absence of scales. There are three broad flat rays in each membrane.

The *mouth* is retractile, and placed under the snout, but when protuded extends a little beyond it. When the lips are closed, the orifice of the mouth has a horse-shoe shape, but when the jaws are extended it is nearly quadrangular—it admits the little finger. The lips are attached to the intermaxillary and lower jaw-bones, and are rough with large papillæ, particularly the lower one, which expands into two pendulous flaps. There are no cirrhi.

The *palate* is lined by a thick gelatinous membrane of a light-red colour, which rises anteriorly into two uvula-like eminences, forming the commencement of a sulcus leading towards the pharynx. The sulcus is obliterated posteriorly by a large pulpy cushion, against which the branchial arches may be pressed. This cushion covers, or lines, a number of small bones and cartilages, which connect the superior extremities of the branchial arches with each other; united to it posteriorly there is a cordiform substance of firm texture and white colour, which lines an irregular cribriform osseous plate, that projects from the basilary process of the occipital bone. Certain processes of the inferior pharyngeal bones, when pressed against the callous cordiform substance just mentioned, may serve to comminute the tender insects on which this fish preys.

There are no *teeth*, but the processes of the inferior pharyngeal bones resemble teeth in their form and office. These, to the number of thirty-six, project from the bone on each side, in a pectinated manner, are compressed laterally, somewhat club-shaped, a little worn on their summits, and gradually diminish in size, as they recede from the mæsial line. The pharyngeal bones themselves, which give origin to these processes, are very strong, bear a resemblance in shape to the hoof of a horse, are lined with the same membrane as the inner surfaces of the branchial arches, and surround about two-thirds of the pharynx. The processes of these bones are the only parts about the pharynx not thickly covered with membrane; their bodies are continuous with, and have the same structure as, the rest of the bone; but two or three of the largest have narrow crowns, approaching to enamel in texture. There is no superior pharyngeal bone, unless the very irregular process of the occipital bone may be so denominated.

The *branchial arches* are furnished with a double row of thin, and rather rigid, crests, having scolloped margins. These, when pressed against the soft cushion in the roof of the mouth, must suffice to retain the food, until it undergoes that degree of mastication which the apparatus in the pharynx is capable of giving.

The œsophagus is short and muscular, and its lining has a glandular appearance. The intestinal canal, from pharynx to anus, makes four convolutions and a half, and bears a proportion to the length of the fish, excluding the caudal fin, of 50 to 18, or 2.8 to 1. The proportions, however, vary somewhat in different individuals. The upper part of the canal, answering to the stomach, has a greater diameter; at the first turn it suddenly undergoes a small contraction, by which a minute sac is formed on one side of the canal only. From this contraction to the anus, the diameter of the intestinal canal, and the strength of its coat, diminishes gradually. Its inner membrane is disposed throughout in minute and delicate rugæ, which have a longitudinal direction, but are indented and waved into each other in a very beautiful manner. There are no cæca.

The lobes of the *liver* are numerous, and so intermixed with the folds of the gut, that it is difficult to separate them entire. It has a pale colour. The gall bladder lies betwixt the intestines and air bladder. Its duct opens into the upper part of the stomach, immediately behind the septum of the thorax. The bile is pale.

The *spleen* is large, and lies in a semicircular form round the upper part of the exterior convolution of the intestine.

The *air bladder* extends the whole length of the abdomen, and consists of two portions, united by a very short tube. The upper portion is shorter, and is furnished with a remarkably thick shining white capsule, which adheres strongly at its upper end to the spine and septum; a very slight degree of force suffices to thrust the bladder out of the capsule. The true coats of both portions are firm, and less readily torn than the above-mentioned capsule, but are much thinner. A small tube for discharging the air proceeds from the upper end of the lower portion of the bladder.

The *kidneys* extend the whole length of the abdomen, and are connected with each other, immediately below the diaphragm, by a transverse lobe. The urinary bladder is a long tube, whose width scarcely exceeds the joint diameters of the ureters.

The *lining* of the abdomen is white. The intestines are attached on every side to the parietes of the abdomen, by numerous processes of the peritonæum.

The intestines are infested by small worms, which fix themselves to their inner coats by a kind of proboscis.

Fins.—The pectoral fins are elliptical, and are four times and a half shorter than the body of the fish, estimated from the setting on of the head to the base of the caudal fin. The dorsal fin is rhomboidal; its first ray is short, the next about two inches long, the posterior ones gradually become a little shorter; the last one is nearly bipartite; their numbers vary from twelve to fourteen. The ventrals are situated opposite to the dorsal, are rather small, and have an obtuse unequal obovate

shape. The anal fin is slightly longer than the pectoral, and its tip, when turned back, reaches to the base of the caudal. Its rays are very strong; the posterior one is divided almost to its base. The caudal fin is linear-cuneiform, forked not quite to half its length, with its lobes rather obtuse, and the lower one slightly larger than the upper one. Its rays are strong. The rays of all the fins are articulated and branched at their tips.

B. 3. P. 17. D. 13. V. 10. A. 7. or 8. C. $18\frac{3}{3}$.

The dimensions of an ordinary-sized fish are as follow;—

Length from snout to caudal fin, eighteen inches.

Length of the caudal, anal, and pectoral fins, each about three inches.

One of the specimens I examined had some fragments of a shell in its gut, but soft insects seem to compose the greater part of the food of this fish.

Catastomus Forsterianus.

Red Sucker *of the Traders*, Meethqua-maypeth, *Cree Indians.*

Gen. Cyprinus, L. Catastomus, *Le Sueur*. Sub-genus Lenciscus. *Cuv. Règ. An.* p. 194.

Cyprinus, Catastomus, Var. *Forst. Philos. Trans.* vol. lxiii., p. 158.

Mithomapeth. *Pennant's Arctic Zoology, Introd.* p. ccxcix.

Body.—The shape of this fish bears a general resemblance to that of the preceding species, but the back is broader and straighter, and the depth less, scarcely exceeding the thickness of the body, and being about one-fifth of its length. The body tapers gradually from the shoulder to the origin of the caudal fin. The sides and back are a little flattened.

The *lateral* line runs on a level with the eye straight to the tail, without curving upwards over the anal fin.

The *colour* of the back is intermediate between honey-yellow and oil-green; the sides are lighter, and along the lateral line there is a broad irregular stripe, or rather a series of indeterminate patches of light lake red. The belly is white. The anal and ventral fins are slightly tinged with ochre yellow. The other fins partake of the colours of the parts to which they are attached.

The *scales* are oval, very considerably smaller than those of the preceding species, and, being entirely covered by a thin membrane, have little lustre; they are very small behind the occiput and on the anterior parts of the body, but become larger towards the tail.

The *head* is broader than in the preceding and following species. The forehead is not rounded or convex, and the nose is longer and more acute. The head is about one-fourth of the length of the body, reckoning from the gill-openings to the caudal fin.

The *eye*, small and oval, is placed about its own length nearer to the gill-openings

than to the extremity of the snout. The motion of the snout, though greater than that of the namay-peeth, is even in this species obscure.

The *mouth* is larger than that of the namay-peeth, but placed farther back, and when protruded to the utmost scarcely equals the extremity of the snout. The lips are set with larger papillæ and have broader flaps, The interior of the mouth pharynx, branchiæ, &c., do not differ from the same parts in the namay-peeth.—The lining of the abdomen is covered with a pigment similar to that which clothes the choroid coat of the human eye.—This pigment is most abundant on the capsule or the air-bladder.

The distribution and structure of the intestines, are the same as in the other species, except that the spleen lies in the centre of the convolutions. The alimentary canal is, to the length of the body as 47 to 17, or 3.4. to 1.

The air-bladder consists of two portions, the lower of which communicates with the œsophagus by a slender contracted tube.

The fins strongly resemble those of the namay-peeth. The pectorals are upwards of five times shorter than the body, and the tip of the anal, when turned back falls short of the insertion of the caudal. In shape the anal is more obtuse and rounded than the same fin of the namay-peeth ;—the caudal is not so deeply forked.

B 3. P 17. D 11. V 10. A mostly 8. C $18\frac{3}{3}$.

The dimensions of an ordinary-sized fish were,

Length to the caudal fin	17 inches.
Circumference where greatest	12
Depth	$3\frac{3}{4}$
Length from snout to anus	13
—— of alimentary canal	47

The figure of C. communis, Le Sueur, in the work already cited, conveys a pretty good general idea of the appearance of our fish, but the scales of the latter are smaller, and the anal fin placed farther forward than in that species.

The C. Forsterianus was considered by Forster to be only a variety of the C. Hudsonius, but they are so distinct, that I imagine he mentioned it merely from the information of the traders, without having seen even dried specimens.

Catastomus Lesueurii.

Wawpawhawkeeshew, *of the Cree Indians*, Picconoo. *Fur Traders.*
Gen. Cyprinus, *Lin.* Catastomus, *Le Sueur.* Sub-genus Leuciscus. *Cuv. Règ. An.* p. 194.

The shape of this fish resembles that of the namay-peeth, but the lateral line forms a larger curvature posteriorly and the tail is much more bent upwards.

The *colour* of the back and sides is wood brown, reflecting, when moved in the light, several brilliant tints, amongst which emerald-green, and gold-

yellow predominate; the belly is reddish white; the dorsal fin has the same hue with the back, the others are reddish.

The *scales* have for the most part an irregular oval shape, and are very large, being three quarters of an inch long; they are nearly of equal size over the whole body. The uncovered portion of each scale is strongly radiated, and broader than long; their lustre is considerable.

The head is proportionably smaller than that of the Namay-peeth, and the snout is more acute; the gill-openings are small; the lustre of the opercula is similiar to that of the scales; the orbit is orbicular, rather large and placed in the middle of the head.

The *mouth* has a much smaller orifice than that of the namay-peeth and is placed farther back, but not so far back as that of the immediately preceding species, the meethquamay-peeth. When the jaws are retracted, the snout projects about half an inch beyond them, but when protruded the edge of the upper jaw and snout are even. The *lips* instead of being furnished with papillæ, as in the preceding species, are sulcated perpendicularly in a very regular manner.

The palate, pharynx, and contents of the abdomen of this fish nearly correspond with those of the namay-peeth, they are, however, in general proportionably smaller. The œsophagus is remarkably contracted, which gives to the commencement of the gut an appearance of dilatation. The intestines are not connected to the parietes of the abdomen by such numerous folds as in the namay-peeth. The length of the alimentary canal is to that of the fish, as 2.56 to 1. The lining of the abdomen is white.

The air-bladder in this species is divided into three portions, the central of which is the largest, and communicates with the œsophagus. The upper portion is alone furnished with a capsule.

Fins—The dorsal fin is probortionably larger than that of the two preceding species. The length of the pectoral fins is more than five times less than that of the body, reckoning from the gill-openings to the tail. The extremity of the anal rather passes the origin of the caudal fin.

B 3. P 15. D $13\frac{1}{1}$ V 9. or 10. A $7\frac{1}{1}$. C $18\frac{3}{3}$.

The most striking external differences betwixt this fish and the namay-peeth, consist in the great size of the scales, their lustre, the smallness of the head, and the structure of the lips. The three species we have described may be also readily discriminated by the colour of the peritonæum, and number of portions into which the air-bladder is divided. The usual length of this fish is sixteen inches, exclusive of the caudal fin.

The wawpawhawkeeshew is considered by the Indians to be hybrid betwixt the namay-peeth and the attihhawmegh (*Coregonus albus.*)

Of the figures given by Le Sueur in the work so often cited, the C. Duquesnii most resembles the wawpawhawkeeshew, and we have some doubts of their being specifically different, but the greater size of the head and mouth, and the rather smaller scales of the latter, have prevented us from uniting them until the matter is decided by actual comparison, or fuller descriptions. The specific name we have employed is a tribute to the merit of M. Le Sueur, who has established and illustrated this genus.

In addition to the three species of carp here described, we observed a fourth of considerably smaller size at Carlton-House, but circumstances prevented us from taking a description of it at the time, and we did not afterwards meet with it. They all spawn in June. They are not esteemed as articles of food, being soft and watery when boiled, but they have no disagreeable flavour. The namay-peeth is very abundant in the Saskatchawan; the meethquamay-peeth is more common to the northward of Great Slave Lake; and the wawpawhawkeeshew is comparatively rare every where.

Silurus Felis? Cat-fish.

Mathemegh, *Cree Indians.* Cat-fish and Barbue *of the Traders.*
Genus Silurus, *Lin.* Sub-genus Pimelodus, *Cuv. Règ. An.* p. 203.
Silurus felis, *Gmel. Lin. Syst. Nat.* p. 1356?
Mystus, No. 1., *Seba Thesaur.* p. 82, t. xxix. fig. 1?

Body oblong, tapering posteriorly, belly swelling out considerably before the central fins. Lateral line straight.

The *colour* of the back and sides is dark greenish-brown, and nearly uniform; the belly approaches to white.

The *head* is flat and broad, the transverse diameter being equal to its length. There is no distinct osseous plate at the nape of the neck, but there is a small lengthening out of the cranium, which is concealed by the thick smooth skin which covers the head; the snout is very obtuse, almost semicircular.

The *mouth* is large, and placed at the extremity of the head; the upper lip projects very slightly beyond the lower one.

The maxillary bones are lengthened out into cirrhi, which are as long as the head. A slender cirrhus, about an inch long, rises on each side from the upper margins of the nostrils, and there are four cirrhi on the lower jaw, of which the outermost are $2\frac{1}{2}$ inches long; the other two are shorter.

There is a crowded assemblage of small erect teeth on the upper and lower jaw, but the palate and vomer are smooth. The first dorsal is sub-quadrangular, and contains seven rays, of which the first is very strong and bony, but not denticulated; the others are branched.

The first ray of the pectorals is still stronger, and also free from denticulations.

The ventrals are about one-fourth part nearer to the head than to the tail. The adipose fin is moderately large, and opposite to the posterior third of the anal fin. The anal fin is large and long, and terminates about one-third of its own length from the insertion of the caudal fin. The caudal fin is widely emarginated with obtuse rounded lobes.

D 7. P 7. V 9. A $23\frac{2}{2}$. C $17\frac{1}{3}$.

Length, exclusive of caudal fin, 30 inches.

This fish differs from Seba's in size, the latter being only $5\frac{3}{4}$ inches long, and in wanting serratures on the first ray of the dorsal fin, and teeth on the palate. Both, however, are described from dried specimens, and they agree in so many circumstances, that it has been judged best to consider Seba's as a young mathemegh. We had neglected to take a description from a recent fish. The silurus catus of Catesby differs in having its first dorsal fin of a conical form, placed in the middle of its body.

The nathemegh is found sparingly in the lakes that flow into the Saskatchawan, and more abundantly in the lakes and rivers to the southward. It is much prized as a rich food.

Gadus Lota. L. Burbot.

Methy, *Cree Indians.* La loche, *Canadian voyagers.*

Gadus lota and Methy, *Phil. Trans.* lxiii. p. 152, *Arctic Zoology*, and *Hearne.*

Burbot, *Donov. Br. Fishes*, t. 92, *Bloch.* t. 70.

The burbot is found in every river and lake in the country, and attains the length of 30 inches, or more. It spawns in February. It preys upon every kind of fish that it can swallow, and in the spring its stomach is generally crammed with cray-fish, often to such a degree as to distort the shape of the body.

The burbot is so little esteemed as food as to be eaten only in cases of necessity. Very good bread, however, may be made of the roe, and the livers are always prized. Dogs will scarcely ever eat this fish.

Pleronectes Stellatus.

Sub-genus, Platessa, *Cuv. Règ. An.* tom. ii. p. 220.

Pleuronectes Stellatus, Pallasii, *Nov. Act. Petropol.* tom. i. an. 1787, p. 347, t. ix. f. 1; and *Mémoires de l'Acad. de Petersbourg*, tom. iii. p. 248, t. x. f. 1. (The latter figure errs in the dorsal fin not being carried far enough forward.)

Stellated Flounder. *Shaw's Zoology*, iv. pt. ii. p. 235.

This fish was found at the mouths of the rivers in the Arctic Sea.

Pleuronectes Glacialis.

Sub-genus, Rhombus, *Cuv. Règ. An.* tom. ii. p. 222.

Pleuronectes glacialis, *Pall. Itin.* p. 706, *Gmel. Lin.* p. 1235.

Found in Bathurst's Inlet of the Arctic Sea.

Perca Fluviatilis, var.? L.

Occow, *Cree Indians.* Horn-fish, Piccarel, or Dorè, *of the Traders.*
Gen. Perca, *Lin.* Sub-genus Perca, *Cuv. Règ. Ann.* ii. p. 293.
Perca volgensis? *L. Gmel.* or P. aspera? *Pall. Itin.* i. p. 461.

The perch of Hudson's Bay differs in so many respects from the European one, that it has been thought proper to give the following description of it. In its fins it bears a stronger resemblance to the Perca Volgensis described by Pallas, although La Cepede has referred the latter to the Lucio-Perca, which belongs to another of Cuvier's sub-genera.

Shape that of the common river perch.

Colour.—The back and sides have a greenish colour, alternating in small spots with king's yellow. The belly is white. The first dorsal fin is beautifully streaked and clouded with different shades of yellowish-brown, and there is a dark patch of venous blood-red on its posterior part. The second dorsal, pectoral, and caudal fins are coloured and spotted like the back. The lower lobe of the caudal is tipped with white. The ventral and anal fins are white, clouded with king's yellow. The latter has, moreover, a slight tinge of red. The upper part of the head is coloured like the back. On the cheeks there are some light shades of cherry-red, mixed with yellow. The irides have a purple colour, intermixed with spots of pearl white.

The scales are of a medium size, and rough from minute teeth on their exterior edges.

Head.—The lateral outline of the head, when the mouth is shut, is that of a cone, whose summit, formed of the extremities of the upper and lower jaws, is rather obtuse. The pre-operculum, of a thin crescentic shape, is entirely unconnected with the operculum. Its posterior edge is free, and armed with small irregular tooth-like processes. The inter-operculum is unarmed. The operculum and sub-operculum have conjointly the form of a triangle, of which an entire side and the apex, which is lengthened out by a membranous flap, are constituted by the sub-operculum. This latter bone is unarmed, but the operculum has three or four small spines, which scarcely project through the skin in the recent fish. The nape of the neck is armed on each side by a rough bony plate, whose posterior edge projects a little. The cheek is large, fleshy, and posterior to the orbit. There are several plates of scales on the anterior parts of the cheek, the opercula, and occiput. The os frontis has numerous sulcæ, which appear through the thin skin that covers it.

The eyes are large and prominent.

The orifice of the mouth is large. The jaws are of equal length, but the upper one is more obtuse, and receives into a depression the more pointed extremity of the lower one. The inside of the mouth is of a bluish-white colour, and in some places a layer of nacre shines through the lining membrane.

Teeth.—The two largest teeth of the upper jaw project on each side of the snout, like the canine teeth of some quadrupeds, and are visible when the mouth is closed, having formed for themselves depressions in the lower lip. These teeth stand on the intermaxillaries, which form, with the lower jaw, the whole margin of the mouth. The intermaxillaries are further armed with a single crowded row of smaller teeth, and the lower jaw has a thin row of teeth, similar to the two remarkable ones in the upper jaw. A set of strong distant teeth are also arranged, somewhat in a horse-shoe form, on each side of the roof of the mouth, and across the vomer, so as to be nearly opposed to those in the lower jaw. These teeth are situated upon the palatine bones and vomer, and, like those on the jaws, are somewhat hooked, with their points directed backwards. The tongue is smooth.

The *branchiostegous membranes* overlap each other, at their insertion into the root of the tongue. They contain seven rather distant cylindrical curved rays. The three inner branchial arches are furnished with double rows of tubercles, covered with minute teeth. The outer arch has a single row of similar protuberances, and also a row of processes about half an inch long, which are armed on their inner surfaces with small crowded hook-shaped teeth. The superior andinferior pharyngeal bones are also rough, with minute teeth.

Fins.—The first and second dorsal are about an inch apart, differing in this respect from Bloch's figure of the P. fluviatilis, t. 52. The former fin is the highest, and its rays are spinous. Those of all the other fins are articulated—

B. 7. P. 14 or 15. V. 6. D. 15—21 or 22. A. 13. C. 16 or 18.

The dimensions of an ordinary-sized fish were—

Length to caudal fin	19 inches.
—— to anus	12
—— of caudal fin	3
Height of 1st dorsal fin	2½
—— 2d do. do.	2

Length of alimentary canal from pharynx to anus, 20

The perch spawns in May. It is very abundant about Cumberland-House. We did not observe it to the northward of Great Slave Lake.

Cottus Hexacornis. Six-horned Bull-head.

The *body* is much less than the head, roundish and tapering to the extremity of the tail. The *lateral line* is rough, and runs near the back. There is a row of small orbicular scabrous bony plates between it and the back ; the row is double, opposite to the second dorsal fin. There are no other perceptible scales.

Colour.—The colour of the body is a clouded admixture of tints of broccoli-brown and olive-green. The belly is white. The fins are streaked with bluish black.

The *head* is large and depressed. The posterior edges of the operculum and sub-operculum are armed with four or five small spinous teeth. The pre-operculum is furnished with three strong divaricated spines, the posterior of which is the largest, and half an inch long. The bones which support the pectoral fins are also armed with small spines, and have sharp rough edges. There are six obtuse club, or rather nail-shaped processes, rising from the crown of the head. Their surfaces are minutely cancellated and scabrous. The smallest pair stand betwixt the nares, the largest on the superior posterior margins of the orbits, and the third on the occiput.

The *eyes* are large; the irides are tinged red.

The *mouth* is capacious, and has its margin formed by the intermaxillaries and lower jaw. The maxillaries, of a long cuneiform shape, lie in a membrane behind the intermaxillaries. The jaws and vomer are set with a crowded assemblage of small teeth. The maxillaries, palate, and tongue, are smooth. The tongue is obtuse. The *anus* is situated about midway between the mouth and caudal fin.

The *branchiostegous membrane* is capable of inflation, and contains six slender cylindrical curved rays.

Fins.—The pectoral fins are sub-orbicular, with sixteen rays, none of them branched. The ventral fins, soft and whitish, have three rays, of which the first is the strongest; none of them are spinous. The anterior dorsal fin commences posteriorly to the pectoral fins, and terminates opposite to the anus. It has seven simple rays. The posterior dorsal is larger, and has thirteen rays. Its commencement and termination correspond with those of the anal fin—most of its rays are scabrous. Both dorsal fins are arched. The anal fin commences a short way behind the anus, and terminates so as to leave about one-third part of the tail naked. Its depth slightly diminishes as it recedes backwards. The caudal fin is cuneiform, and has twelve rays, most of them forked.

B. 6. P. 16. V. 3. A. . D. 7—13. C. 12.

This fish is found abundantly in the Arctic Sea. Our Canadian voyagers gave it the name of Crapaud de Mer, which is very expressive, but has been already applied to a different fish.

It resembles the cottus quadricomis Bloch, t. 108, very strongly in form and dimensions; but, exclusive of differences of the number of rays in the fins, the additional pair of horns forms a distinguishing character. The body, too, appears to be less rough than in Bloch's species.

Gasterosteus Pungitius? L.

Sub-genus Gasterosteus. ***Cuv. Règ. An.*** **ii. p. 300.**

Great numbers of small fish of this genus were observed, in the spring of 1820, in a small pond in the neighbourhood of Cumberland-House. We are inclined to refer them to the above-mentioned species, but the description of them not having been preserved, we are unable to do so with certainty. Specimens of them, which were put in spirits, were destroyed on their way home.

No. VII.

BOTANICAL APPENDIX,

BY

JOHN RICHARDSON.

The following list of plants is not offered, as containing any thing like a full catalogue of the Flora of the country through which we travelled. During our summer journeys, only a small portion of time could be allotted to Botanical researches, and the constant and more important duties of the other officers prevented them from aiding me in collecting objects of Natural History, which they were otherwise anxious to do. Under such circumstances, a large proportion of plants must have escaped our notice, and the disasters attending our return across the Barren Grounds from the sea-coast, caused us to leave behind the whole collection made during the summer of 1821, with the exception of a few plants collected during the descent of the Copper-Mine River, which were intrusted to Mr. Wentzel's care when he left us. The part of the collection, which is lost, contained some plants, which I deemed to be new or curious.

In drawing up the list, imperfect as it is, I have received much assistance from able botanists. To Mr. Brown, I am under the greatest obligations, not only for the liberal use of the Herbarium and Library, which, so happily for science, have been placed in his possession ; but, also for the friendly manner in which he aided my researches, and condescended to solve the doubts so frequently presenting themselves to one little versant in these pursuits. In addition to this general assistance, he kindly superintended the botanical drawings, and has enriched my catalogue with the lists of the Cyperoideæ (including the Carices) the Gramineæ, Junci and Filices, and, with the accounts of the genera Eutoca, Heuchera, and Cryptogramma.

The collections of Pallas and Pursh, now belonging to Mr. Lambert, rendered the power of referring to his valuable Herbarium an object of the utmost importance to me ; and the desire of promoting the science, which so eminently distinguishes his character, induced him cheerfully to accord it.

Professor Schwægrichen, when in London, named the Musci, which renders that part of the list of high authority ; and Professor Hooker, by undertaking the examination of the Lichenes and Fungi, has stamped a value upon a portion of the catalogue, upon which it was peculiarly desirable to have the opinion and authority of an eminent cryptogamic botanist.

To reduce the size of the catalogue, the particular habitats of the plants have been omitted and letters placed in brackets, at the end of the references, to denote the districts in which they were found.

(H.) Denotes the country about York Factory, which includes a small portion of the sea-shore of Hudson's Bay, and the lower part of Hayes' River.

(S.) Distinguishes some plants that were collected on the banks of the Saskatchawan, but were not observed farther to the northward.

(C.) Denotes the sandy plains in the neighbourhood of Carlton, strongly resembling the plains of the Missouri, upon which the American botanists have lately made extensive collections.

(W.) Denotes the wooded country from latitude 54° to 64° north.

(B.) Denotes the Barren Grounds from Point Lake to the Arctic Sea.

(A.) Denotes the Arctic Sea-Coast.

For an account of these districts, I must refer to the geological notices at the commencement of the Appendix. The necessity of reducing the size of the Appendix has also compelled me to omit some remarks on the geographical distribution and limits of some of the plants, and of the effect of the Hudson's Bay climate upon vegetation, and also many descriptions of the new, or less known, species. Other more important omissions and mistakes will, doubtless, be detected, for which I can only plead the haste with which the work has been got out.

MONANDRIA.

1. Hippuris vulgaris: *Willd. Spec. Plant.* i. p. 26. *Pursh. Fl. Amer.* i. p. 3. (W.)
2. H. tetraphylla: *Willd.* i. p. 27. H. maritima: *Vahl. Enum.* i. p. 14. (H.)
3. Blitum capitatum: *Willd.* i. p. 30. *Pursh.* i. p. 4. (W.)

DIANDRIA.

4. Veronica peregrina: *Willd.* i. p. 76. *Pursh.* i. p. 11. (W.)
5. Pinguicula vulgaris: *Willd.* i. p. 110. (W. B.)
6. Utricularia intermedia: *Wahlenberg. Fl. Lapp.* p. 11. (W.)
7. Lemna trisulca: *Willd.* iv. p. 193. (W.)
8. L. minor: *Willd.* iv. p. 195. *Pursh.* i. p. 22. (W.)

TRIANDRIA.

9. Valeriana sylvatica: floribus triandris hermaphroditis, foliis caulinis pinnatis acutis; radicalibus oblongis integerrimis. *MS. Herb. Banks.*

Hab. on the Clear-water River. Specimens of this plant were brought from Newfoundland by Sir Joseph Banks, in 1781.

10. Sisyrinchium anceps: *Persoon. Ench. Bot.* i. p. 50. *Pursh.* i. p. 31. (W.)
11. Eleocharis palustris: *Roem. et Sch. Syst.* ii. p. 151. Scirpus palustris: *Willd.* i. p. 291. *Pursh.* i. p. 54. (W.)

12. Scirpus cœspitosus: *Willd.* i. p. 292. (B.)

13. S. lacustris: *Willd.* i. p. 296. *Pursh.* i. p. 56. (W.)

14. S. maritimus: *Willd.* i. p. 306.

Hab. Salt River Athabasca.

15. S. sylvaticus: *Willd.* i. p. 307. *Pursh.* i. p. 56. (W.)

16. Eriophorum vaginatum: *Willd.* i. p. 312. (W. B.)

17. E. angustifolium: *Willd.* i. p. 313. *Pursh.* i. p. 58. (W. B.)

18. E. strictum: spicis pedunculatis involucro brevioribus, squamis acutiusculis tenuissimè ciliatis, foliis strictis planis apice triquetro, culmo teretiusculo. *Brown, M. S.*

Dubia species E. tenello *(Nutt.)* proxima. Brown (W.)

19. Alopecurus alpinus: *Smith. Fl. Brit.* iii. p. 1386. (B.)

20. A. aristulatus: *Mich. Am.* i. p. 43? A. subaristatus: *Pers. Ench.* i. p. 80. *Pursh.* i. p. 66. (W.)

21. Agrostis laxiflora: Trichodium laxiflorum: *Mich. Am.* i. p. 42. t. 8. *Pursh.* i. p. 61. (W.)

22. Stipa Canadensis: *Poiret. Encyclop. Bot.* vii. p. 452. *Pursh.* i. p. 72. Stipa juncea: *Mich. Am.* i. p. 54. (W.)

23. Oryzopsis asperifolia: *Mich. Am.* i. p. 51. t. 9. *Pursh.* i. p. 60. (C.)

24. Calamagrostis Canadensis: *Nuttall. Gen. Amer. Pl.* i. p. 46. Arundo Canadensis: *Mich.* i. p. 73. (W.)

25. C. stricta: Arundo stricta: *Schrad. Germ.* i. p. 215. t. 4. f. 5. *Smith. Compend. Fl. Brit.* p. 20. *Eng. Bot.* t. 2160. (W.)

26. C. purpurascens: panicula spicata, glumis glabris, perianthii valvula inferiore scabra: apice 4-dentato; dorso aristata, rudimento plumoso villis baseos duplò longiore. *Brown, MS.* (B.)

27. Aira aquatica: *Willd.* i. p. 376, (W.)

28. Hierochloa fragrans: *Roem. et Sch. Syst.* ii. p. 514. Holcus fragrans: *Willd.* iv. p. 936. *Pursh.* i. p. 78. (W.)

29. H. *alpina: Roem. et Sch. Syst.* ii. p. 515. Holcus alpinus: *Wahl. Fl. Lapp.* p. 31. t. 2. (B.)

30. Trisetum airoides: *Roem. et Sch. Syst.* ii. p. 666. Aira subspicata: *Willd.* i. p. 377. (W.)

31. Avena striata: *Mich. am.* i. p. 73. *Pursh.* i. p. 86. (W.)

32. Beckmannia erucæformis: *Roem. et Sch. Syst.* ii. p. 695. Cynosurus erucæformis: *Willd.* i. p. 412. (W.)

33. Poa crocata: *Pursh.* i. p. 80. (W.)

34. P. alpina: *Willd.* i. p. 386. *Pursh.* i. p. 79. (W.)

35. Festuca ovina: *Willd.* i. p. 419. (W.B.)

36. Bromus purgans: *Willd.* i. p. 431. *Pursh.* i. p. 85. (W.B.)

37. Hordeum jubatum: *Pursh.* i. p. 89. (W.)

38. Elymus Canadensis: *Willd.* i. p. 468. *Pursh.* i. p. 89. (W.)

39. E. mollis: spica erecta villosa, locustis geminatis 4-5-floris brevè setigeris glumas setaceas superantibus. *Brown, MS.* (W.)

TETRANDRIA.

40. Galium tinctorium: *Willd.* i. p. 586. (W.)

The Cree women dye their porcupine quills red with the juice of this plant, or of the G. boreale, indiscriminately.

41. G. boreale: *Willd.* i. p. 595. *Pursh.* i. p. 104. (W.)

42. Plantago major: *Willd.* i. p. 641. *Pursh.* i. p. 98. (W.)

43. P. lanceolata, var.? bracteis obtusissimis, foliis latè lanceolatis glabriusculis. (W.)

P. lanceolata β? *Willd.* i. p. 644. P. montana? *Huds. Flor. Angl.*, ed. i. p. 53. (B.)

44. Cornus Canadensis: *Willd.* i. p. 661. *Pursh.* i. p. 107. Sassagoomena-ahtick, *Cree lang.* (W.)

45. C. alba: *Willd.* i. p. 662. *Pursh.* i. p. 109. (W.)

The lead-coloured berries are named by the Crees, musqua-meena (bear-berry), because the bear fattens upon them.

46. Elæagnus argentea: *Nuttall. Am. Gen.* i. p. 97. E. nitida: *Banks' Herb.*
Elæagrus argentea: *Pursh.* i. p. 114. (W.)

47. Potamogeton perfoliatum: *Mich. Flor. Am.* i. p. 101.

Folia cordato-lanceolata, longè acuminata, longitudine spithamea, latitudine ad basin pollicaria. Species forsan distincta. (W.)

48. P. pectinatum: *Smith. Fl. Brit.* i. p. 197. *Eng. Bot.* t. 323. (H.)

PENTANDRIA.

49. Batschia conspicua: caule pilis laxis, foliis oblongis pilis adpressis vestitis, laciniis corollæ integris. (W.)

Radix perennis caules plures alens. *Caulis* dodrantalis, erectus, pilosus, supernè in spicas foliosas di-vel tri-chotome divisus. *Spicæ* reclinatæ divaricatæ, juniores spiraliter revolutæ. *Folia* omnia oblonga, plerumque obtusa, pilis brevissimis, adpressis vestita, subtus pallidiora: floralia subsecunda et apicem versus spicarum sensim minora. *Calyx* axillaris, sessilis, hirsutus, laciniis subulatis tubo corollæ triplò brevioribus. *Corolla* aurantio-flava, extus pilosiuscula, intus glabra; *tubo* supernè paulo ampliato: *fauce* fornicato, sed non clauso: *limbo* patente, laciniis quinque rotundatis sub-undulatis integerrimisque. *Stylus* longitudine tubi. *Antheræ* medium versus tubi adnatæ.

Hab. In dry woods, on the banks of the Saskatchawan, growing in large patches.

50. B. longiflora: *Nuttall. Gen. Amer.* i. p. 114. (C.)

51. Myosotis Lappula: flore albo. *Willd.* i. p. 749. *Pursh.* i. p. 34. (W.)

52. Pulmonaria paniculata: *Willd.* i. p. 769. *Pursh.* i. p. 131. (W.)

53. P. maritima: *Smith. Fl. Brit.* i. p. 218. (H. A.)

54. Androsace elongata: *Willd.* i. p. 797. (W.B.)

55. A. septentrionalis: *Willd.* i. p. 748. (B.)

56. Primula Egaliccensis: *Flor. Dan.* t. MDXI. *Lehman. Monogr.* p. 64. t. vii. (B.)

Flos rubescenti-albus, ore citrino.

57. P. farinosa: *Smith. Fl. Brit.* i. p. 224. (W.)

58. P. Hornemanniana: *Lehman. Monogr.* p. 55. t. iv.

P. Farinosa β stricta: *Wahl. Fl. Lapp.* p. 60, cujus descriptio cum plantâ nostrâ optimè quadrat. P. farinosa quâcum habitat minor, umbellâ florenti longiori et magis divaricatâ; umbellæ fructiferæ tamen in ambabus strictæ. Involucri foliola huic et præcedenti plura adsunt quam P. Egaliccensi sed ut in illâ baseos gibbosos habent. (W.)

59. Dodecatheon integrifolium: *Michaux. Fl. Am.* i. p. 123.

Our specimens agree with those in the Lambertian Museum, from Eastern Siberia, collected in Billings' Expedition. (W. C.)

60. Menyanthes trifoliata: *Willd.* i. p. 811. *Pursh.* i. p. 139. (W.)

61. Lysimachia thyrsiflora: *Mich. Fl. Amer.* i. p. 127. (W.)

62. Phlox Hoodii: humilis multicaulis, foliis subulatis margine lanatis, floribus sessilibus solitariis, limbi laciniis obovatis. (C.)

Tab. 28. Expl. Icon. figura plantæ magnitudine naturalis. Sequentes omnes ad lentem auctæ. *a.* folia duo. *b.* flos. *c.* calyx longitudinaliter fissus et explanatus. *d.* corolla aperta ad venas ejus stamina et pistillum ostendendas. *e.* stamen.

This beautiful species is a striking ornament to the plains in the neighbourhood of Carlton-House, forming large patches, which are conspicuous from a distance. The specific name is a small tribute to the memory of my lamented friend and companion, whose genius, had his life been spared, would have raised him to a conspicuous station in his profession, and rendered him an ornament to any science to which he might have chosen to direct his attention.

63. Eutoca Franklinii: foliis pinnatifidis bipinnatifidisve, ovulis placentæ singulæ viginti pluribus. *Brown ad finem hujus catalogi.* (W.)

64. Campanula rotundifolia: *Willd.* i. p. 892. *Pursh.* i. p. 159 (W.)

var. linifolia: *Flor. Dan.* t. 189. *Linn. Fl. Lapp.* No. 84. (W.)

65. C. uniflora: *Willd.* i. p. 890. *Wahl. Fl. Lapp.* p. 63. (B.)

66. Azalea procumbens: *Willd.* i. p. 832. *Pursh.* i. p. 154. (B.)

67. Caprifolium parviflorum: *Pursh.* i. p. 161. (W.)

68. Xylosteum cæruleum: Lonicera cærulea. *Willd.* ii. p. 988. (W.)

69. X. villosum: *Michaux. Fl. Am.* i. p. 106. (W.)

70. X. involucratum: pedunculis bifloris, baccis distinctis, involucro tetraphyllo: foliolis sub-rotundis interioribus bilobis, foliis ovato ellipticis. Lonicera involucrata: *M.S. Herbario Banksiano.* (W.)

71. Symphoria occidentalis: *R. Brown. M.S.* (W.)

S. racemosæ proxima.

72. Rhamnus alpinus: *Willd.* i. p. 1097. (W.)

73. Ribes rubrum: *Willd.* i. p. 1153. (W.)

74. R. glandulosum: *Willd.* i. p. 1154. R. prostratum: *Pursh.* i. p. 163. (W.)

75. R. nigrum: *Willd.* i. p. 1156. (W.)

76. R. floridum: *Willd.* i. p. 1156. *Pursh.* i. p. 164. (W.)

77. R. oxycanthoides: *Willd.* i. p. 1159. *Pursh.* i. p. 165. (W.)

78. Viola pinnata: *Willd.* i. p. 1160. (C.)

79. V. blanda: *Pursh.* i. p. 72. (W.)

80. V. debilis: *Nuttall. Gen. Amer.* i. p. 150. (W.)

81. V. canina: var.? *Willd.* i. p. 1164. (W.)

82. V. Canadensis: *Willd.* i. p. 1166. *Pursh.* i. p. 174. (C.)

83. Comandra umbellata: *Nuttall. Am.* i. p. 157. Thesium umbellatum: *Pursh.* i. p. 177.

Comandra a Santalo differt calyce persistente monentè doctiss. Brown, qui primus genus distinctum esse. Prodr. pl. Novæ Hollandiæ, i. p. 353. indicavit. (W.)

84. C.: livida sarmentosa, foliis ellipticis flaccidis, umbellâ axillari solitariâ pedunculatâ sub-triflorâ. (W.)

Sarmentum inter muscos repens radicem refert et caules alternatim edit. *Caules* spithamæi simplices suffruticosi, erecti, inferne teretes, superne obsolete triquetri. *Folia* elliptica, venosa, obtusa, nervo excurrenti apiculata, flavo-viridescentia, concolora, subsessilia. Umbellâ in medio caulis axillaris, bi-vel triflora, pedicellis brevissimis. *Pedicelli* rarissime foliolo involucrati sunt. Flores parvi, inconspicui. *Calyx* campanulatus, laciniis quinque acutis, viridibus, intus apicem versus fuscis. *Squamæ* virido-fuscæ. *Stylus* crassus. *Germen* nux globosa, calyce coronata.

Variat foliis rugosis flavo maculatis reticulatisq.

Hab. In shady mossy woods. Not seen to the northward of Great Slave Lake.

85. Apocynum androsæmifolium: *Willd.* i. p. 1259. *Pursh.* i. p. 79. (W.)

86. Gentiana amarella: *Willd.* i. p. 1347. (W.)

87. G. crinita: *Willd.* i. p. 1352. *Pursh.* i. p. 185. (W.)

88. G. propinqua: corollâ 5-fida tubuloso-campanulata; apicibus limbi subserratis; fauce nuda, foliis radicalibus lineari-obovatis; caulinis lanceolatis. (H.)

Facies omnino G. pratensis sed fauce nuda.

89. G. rotata: *Gmel. Flor. Sib.* iv. p. 112. No. 78, t. 53, f. 1. (H.)

Cum figurâ Gmelini planta nostra quadrat, forsan tamen a Swertiâ rotatâ, L., species distincta propter lacinias calycis angustas corollâ longiores.

90. Heuchera Richardsonii: calycis limbo inæquali obliquo. *Brown, ad finem catalogi.* (W.)

91. Cicuta virosa: *Willd.* i. p. 1445. (W.)

92. C. maculata: *Willd.* i. p. 1446. *Pursh.* i. p. 195. (W.)

93. Smyrnium trifoliatum: *Nuttall. Am.* i. p. 195. (S.)

94. Viburnum Oxycoccus: *Pursh.* i. p. 203. (W.)

Named, by the Crees, Mongsoa-Meena, or Moose Berry.

95. V. edule: *Pursh.* i. p. 203. (W.)

Its red berries, termed by the Crees, Peepoom-meena (Winter Berry), form a great ornament to the woods.

96. Parnassia palustris: *Willd.* i. p. 1516. *Pursh.* i. p. 208. (H. W. B.)

97. Azalea nudicaulis: *Willd.* i. p. 1521. *Pursh.* i. p. 209. (W.)

The Crees use the root of this plant as a remedy against the venereal disease, under the name of Waw-poos-ootchepeh (Rabbit-root), and also apply the bruised bark of its root to recent wounds.

98. Statice armeria: *Willd.* i. p. 1522. *Pursh.* i. p. 212. (B.)

β. Foliis angustoribus acutis ciliatis. (B.)

99. Linum perenne: *Willd.* i. p. 1534. *Nuttall. Am.* i. p. 206. (C.)

HEXANDRIA.

100. Allium angulosum? *Willd.* ii. p. 76. *Pursh.* i. p. 223. (C.)

101. A. schœnoprasum: *Willd.* ii. p. 81. Weechœ`gun (Stinking-Grass), *Cree Lang.* (W.)

102. Lilium Philadelphicum: *Willd.* ii. p. 90. *Pursh.* i. p. 229. (W.)

Termed, by the Crees, Appecooseesh-ootchœpeh (Mouse-root), because the common mouse of the country, a species of Campagnol, feeds upon its scaly bulbs.

103. Uvularia puberula: *Mich. Fl. Am.* i. p. 199. (W.)

104. Smilacina bifolia: Convallaria bifolia. *Willd.* ii. p. 164. *Mich. Fl. Am.* i. p. 201. (W.)

Caule foliisque ciliatis.

105. S. trifolia: Convallaria trifolia. *Willd.* ii. p. 163. *Mich.* i. p. 202. *Gmel. Flor. Sib.* i. t. 6. (W.)

Herba tota glaberrima, caule stricto et non ad insertiones foliorum geniculato ut in priori.

106. S. stellata: *Pursh.* i. p. 232. Convallaria stellata: *Willd.* ii. p. 163? (W.)

107. Luzula campestris: *Decand. Flor. Franc.* iii. p. 161. Juncus campestris: *Pursh.* i. p. 238. (B.)

108. L. melanocarpa: *Desvaux. Journ. de Botan.* i. p. 142. t. 5. f. 2. Juncus melanocarpus: *Pursh.* i. p. 238. (W.)

109. Juncus triglumis: *Willd.* ii. p. 216. (B.)

110. J. castaneus: *Smith. Fl. Brit.* i. p. 383. *Engl. Bot.* t. 900. (H. B.)

111. J. echinatus: *Muhl. Gram. Am.* p. 207? (W.)

112. J. affinis: foliis subulatis nodoso-articulatis, capitulis subpaniculatis pauci-floris (3-5 floris), capsulis ovalibus calyce obtuso hexandro longioribus. *Brown. MS.* (W.)

113. J. filiformis: *Pursh.* i. p. 236. (W.)

114. J. tenuis: *Willd.* ii. p. 214. J. bicornis: *Mich. Am.* i. p. 191. (W.)

115. J. glaucus: *Willd.* ii. p. 206. (W. B.)

116. Oxyria reniformis: *Brown. List of Plants. Ross. Voy.* Ed. 2da. p. 4. Rumex digynus: *Pursh.* i. p. 248. (B.)

117. R. sanguineus: *Willd.* ii. p. 250. *Pursh.* i. p. 247. (B.)

118. R. acutus: *Willd.* ii. p. 253. (W.)

119. R. verticillatus: *Willd.* ii. p. 250. *Pursh.* i. p. 248. (W.)

120. Triglochin maritimum: *Willd.* ii. p. 265. *Pursh.* i. p. 247. (H. A.)

121. T. palustre: *Willd.* ii. p. 264. *Pursh.* i. p. 247. (W. B.)

122. Tofielda borealis: *Wahlenberg. Fl. Lapp.* p. 89. (W. B.)

Scapus nudus, involucris (calyculis, *Wahl.*) albis dimidiatis trifidis pedicellum fulcrantibus ut rectè monet clariss. Wahlenberg. Herba elegans.

123. T. coccinea: spica capitata bracteata, involucro trifido regulari. (A.)

Herba elegantiâ T. borealis totâ carens. Folia basi spathacea, equitantia, compressa, linearia superne lanceolata acuminata plana. *Caulis* palmaris erubescens firmus duriusculus plerumque flexuosus, folio uno alterove radicalibus simili instructus. *Spathæ* folior. caulinor. ventricosæ, rubescentes. *Flores* ferè sessiles in capitulo terminali congesti, interdum proliferi. *Calyx* trifidus, corollæ approximatus, nec dimidiatus, laciniis rubescentibus, brevibus, ovatis, acutis. *Petala* sex viridia, dorso coccineo rubro, interdum tota sordidè coccinea, lineari obovata, calyce triplo longiora. *Capsulæ* tres ovatæ, basi connatæ, petalis altiores polyspermæ. Floret Augusto ad oras maris hyperborei.

Our specimens of this plant were lost in crossing the Barren Grounds; but the above description, which was taken from the live plant, agrees with specimens in the Banksian Herbarium, brought from Unalaska, by Mr. Nelson.

124. Zigadenus chloranthus: scapo sub-nudo, petalis obovatis obtusis. (W.)

Herba glauca glaberrima. *Radix* bulbosa tunicata. *Folia* radicalia, scapo dimidio breviora, erecto-patentia, linearia, acuta, canaliculata, basi vaginantia, nervis parallelis. *Scapus* cubitalis lævis infernè obsoletè triqueter, superne teretiusculus vix flexuosus, foliis duobus bracteiformibus plerumque instructus. *Racemus* [terminalis multiflorus sæpius basi ramosus; pedicellis pollicaribus, apicibus incrassatis; bracteis membranaceis lanceolatis concavis acutis pedicellis dimidio brevioribus. *Flores* viridescenti-albi, masculini hermaphroditis immixti. *Corolla* laciniis sex patentibus, obovatis basi attenuatis infra medium glandulâ viridi obcordatâ profundèque emarginatâ munitis. *Filamenta* corollam subæquantia. *Capsula* membranacea tricocca, trilocularis ovata, acuminata, corollâ emarcidâ obtecta. *Semina* plurima angulata in loculamentis duplici ordini infarcta.

HEPTANDRIA.

125. Trientalis Europæa β Americana: *Nuttall. Am.* i. p. 228. (W.)

OCTANDRIA.

126. Epilobium angustifolium: *Willd.* ii. p. 313. *Pursh.* ii. p. 259. (W. B.)

The young leaves, under the name of L'Herbe Fret, are used, by the Canadian voyagers, as a pot-herb.

127. E. latifolium: *Willd.* ii. p. 314. *Pursh.* i. p. 259. (A.)

128. E. palustre: *Willd.* ii. p. 317. *Pursh.* ii. p. 260. (W. B.)

129. E. tetragonum: *Willd.* ii. p. 317. *Pursh.* i. p. 259. (W.)

130. Vaccinium Canadense: foliis lanceolatis utrinque pubescentibus integerrimis, corollis fasciculato-racemosis ovatis: stylo incluso. (W.)

Frutex pedalis ramosissimus. *Ramuli* teretes, flavescenti-virides, verruculosi et pubè brevî densâ, canescenti vestiti. *Folia* pollicaria, latè lanceolata utrinque acuta, integerrima, ubique præcipuè ad nervos villosiuscula: stipulis minutis setaceis trifidis. *Racemus* plerumque terminalis, bracteis obtusis. *Calyx* acanthino-viridis, nutans, laciniis ovatis. *Corolla* pallidè viridescens, globosa inferne obsoletè pentagona, ore patulo, laciniis ovatis reflexis. *Stamina* inclusa, filamentis planis villosis, cornubus binis deorsum spectantibus. Fructus maturus mihi non visus. *Ramuli* floriferi foliosi. Interdum planta tota fuscescit.

Folia masticata saporem acidam gratam edunt. Specimen hujus plantæ Kalmio lectum et sub hoc nomine in herbario Banks. conservatum extat. *Hab.* in pinetis.

131. V. Vitis Idæa: *Willd.* ii. p. 354. *Pursh.* i. p. 289. Weesawgum-meena (Sour-Berry). *Cree Lang.* (W. B.)

132. Oxycoccus palustris, a: *Pers. Ench.* i. p. 419. Maskœgo-meena (Swampy-Berry). *Cree Lang.* (W. B.)

133. Polygonum erectum: *Willd.* ii. p. 450. (H.)

134. P. viviparum: *Willd.* ii. p. 441. (W. B.)

135. P. cilinode: *Mich. Fl. Am.* i. p. 241. (W.)

136. Adoxa moschatellina: *Willd.* ii. p. 472. (W.)

DECANDRIA.

137. Thermopsis rhombifolia: *Nuttall. Am.* i. p. 282. (C.)

138. Ledum palustre: *Willd.* ii. p. 602. *Pursh.* i. p. 300.—Wisha-capucca: *Hearne's Journey*, p. 456. (W.B.)

This plant is a better substitute for tea than the following one.

139. L. latifolium: *Willd.* ii. p. 602. *Pursh.* i. p. 300. (W.)

Termed by the Crees, Kawkee-kee pucquaw, (always leaves, evergreen,) and sometimes Maskœg, (medicine,) because they suppose that the white residents drink the infusion of it as a medicine.

140. Kalmia glauca: *Willd.* ii. p. 601. *Pursh.* i. p. 296. (W.B.)

141. Rhododendron lapponicum: *Wahl. fl. Lapp.* p. 104. (B.)

142. Andromeda tetragona: *Willd.* ii. p. 607. *Pursh.* i. p. 290. *Brown, Ross's Voy.* (B.)

143. A. polifolia: *Willd.* ii. p. 610. *Pursh.* i. p. 291. (W. B.)

144. A. calyculata: *Willd.* ii. p. 614. *Pursh.* i. p. 291, (W. B.)

145. Arbutus alpina: *Willd.* ii. p. 618. *Pursh.* i. 283. (W.)

146. A. Uva ursi: *Willd.* ii. p. 618. *Pursh.* i. p. 283. Jackashey-puck, *Hearne's Journey.* Kleh, *Chipewyan lang.* Attoongaweeat, *Esquimaux.*

It has received the name of *Sac à Commis*, from the trading clerks carrying it in their smoking-bags.

147. Pyrola rotundifolia: *Willd.* ii. p. 621. *Pursh.* i. p. 299. (W.)

148. P. chlorantha: *Schwartz. Act. Holm.* 1810, p. 190, t. 5. P. asarifolia: *Mich. Am.* p. 251. (W.)

149. P. minor: *Willd.* ii. p. 621. *Pursh.* i. p. 299. (B.)

150. P. secunda: *Willd.* ii. p. 621. *Pursh.* i. p. 299. (W. B.)

151. P. uniflora: *Willd.* ii. p. 622. *Pursh.* i. p. 299. (W.)

152. Chrysosplenium alternifolium: *Willd.* ii. p. 637. (W. B.)

153. Saxifraga nivalis: *Willd.* ii. p. 645. *Pursh.* i. p. 310. (B.)

154. S. Hirculus: *Willd.* ii. p. 649. (H. A.)

155. S. Aizoides: *Willd.* ii. p. 650. *Pursh.* ii. p. 312. (B.)

156. S. oppositifolia: *Willd.* ii. p. 648. *Pursh.* i. p. 311. (B.)

157. S. cernua: *Willd.* ii. p. 652. (B.)

158. S. tricuspidata: *Willd.* ii. p. 657. *Pursh.* i. p. 313. (W. B.)

159. S. grœnlandica: *Pursh.* i. p. 312.—S. cæspitosa, β: *Willd.* ii. p. 657. (A.)

160. Mitella nuda: *Gmel. Sibir.* iv. t. 68. fig. 1. *Willd.* ii. p. 660. M. reniformis: *Pursh.* i. p. 314.—M. prostrata: *Mich. Am.* p. 270. (W.)

161. Silene acaulis: *Willd.* ii. p. 709. *Pursh.* i. p. 316. (B.)

162. Stellaria læta: glauca; foliis lineari-lanceolatis carinatis lævibus, pedunculis sub-geminis terminalibus, petalis longitudine calycis villosiusculi, capsula calycem paulo superanti. (B.)

Caulis decumbens, marcescens ramosissimus; rami erecti palmares debiles uni-vel bi-flori. *Folia* unguicularia, inferiora breviora lanceolata utrinque acuta, superiora magis linearia sensim acuminata, omnia cum caule et pedunculis glaberrima. *Calyx* petalis vix brevior acuminatus obsoletè trinervis, villosus, margine albo. *Petala* bipartita, laciniis linearibus obtusis.

163. St. Edwardsii: *Brown Append. inæd. Parry's Voyage.* (B.) St. nitida: *Hooker in Scoresby's voy.* p. 411?

A priori differt petalis et capsulâ calyce duplò longioribus, foliisque crassioribus aveniis, costâ mediâ vix transparenti. Colore quoque obscuriori nec læto, primo conspectu, distinguitur.

164. St. palustris: *Retz. Fl. Scand. ed.* 2*da*, p. 106. St. glauca; *Smith, Fl. Brit.* p. 475. (W.)

β Iisdem locis crescens differt tantum habitu strictiori, caule villoso et foliis non glaucis. (W.)

165. St. graminea: *Willd.* ii. p. 711. (W.)

A plantâ Britannicâ differt caulis angulis retrorsum scabris.

166. St. gracilis: glaberrima, caule debili, ramis sterilibus gemmâ foliorum terminatis, foliis lanceolatis, flore solitario sub-terminali, calyce trinervi petalis paulo breviore. (H.)

Caulis dodrantalis filiformis acute tetragonus superne ramosus. *Folia* lanceolata acuta integerrima enervia; *caulina* longitudine trilinearia internodiis duplo brevioribus; *ramea* caulinis multo minoribus. *Laciniæ calycinæ* ovatæ acutæ glabræ trinerves, margine hyalino. *Petala* bipartita calyce vix longiora, laciniis lanceolatis obtusis, inferne attenuatis.

167. Arenaria peploides: *Willd.* ii. p. 716. *Pursh.* i. p. 317. (H. A.)

168. A. lateriflora: *Willd.* ii. p. 718. *Pursh.* i. p. 317. (W.)

169. A. propinqua: cæspitosa glanduloso-pilosa, foliis lineari-subulatis acutis trinerviis, calyce acuto trinervi petalis vix longiori capsula breviori. (B.)

Habitus A. vernæ. Folia, caules, pedunculi et calyces pilis crebris brevissimis patentissimis glanduliferis vestiti. Laciniæ calycinæ lanceolatæ acutæ trinerves, nervis validis æqualibus sub-approximatis, margine lato membranaceo, albo. Petala alba ovata vel ovalia obtusa, minora quam in Arenaria verna.

170. A. Rossii: *Brown Append. ined. Parry's Voyage.* (B.)

Fastigiato-ramosissima denseque foliosa, glabra. Folia enervosa. Pedunculi solitarii terminales, elongati, uniflori. Calyx margine purpurascenti. Petala ligulata calyce paulo longiora.

171. Lychnis apetala: *Willd.* ii. p. 810. (B.)

172. Cerastium viscosum: *Willd.* ii. p. 812. *Pursh.* i. p. 320. (W. B.)

173. C. arvense: *Willd.* ii. p. 813. *Pursh.* i. p. 321. (W.)

174. Spergula nodosa: *Willd.* ii. p. 818. (W.)

DODECANDRIA.

175. Hudsonia ericoides: *Willd.* ii. p. 858. *Pursh.* ii. p. 364. (W.)

ICOSANDRIA.

176. Prunus Virginiana: *Willd.* ii. p. 985: *Pursh.* i. p. 329. (W.)

The tawquoy-meen-ahtick of the Crees is a handsome small tree, rising on the sandy plains of the Saskatchawan to the height of twenty feet, but extending as far north as Great Slave Lake, where it attains the height of five feet only. Its fruit, termed Tawquoymeena, or Choke-cherry, is not very edible in a recent state, but when dried and bruised, forms an esteemed addition to pemmican.

177. P. Pensylvanica: *Willd.* ii. p. 992. *Pursh.* i. p. 331. Passeeawey-meenan, *Cree Lang.* (W.)

178. Sorbus Americana: *Pursh.* i. p. 341. (W.)

179. Aronia ovalis: *Pers. Ench.* ii. p. 40. Pyrus ovalis, *Pursh.* i. p. 340. (W.)

This shrub is common as far north as lat. 62°. It abounds on the sandy plains of the Saskatchawan. Its wood, named by the Crees meesassquat-ahtick, is prized for making arrows and pipe stems, and is thence termed by the Canadian voyagers *bois de fleche.* Its berries, about the size of a pea, are the finest fruit in the country, and are used by the Crees under the name of Meesasscootoom-meena, both in a fresh and dried state. They form a pleasant addition to pemmican, and make excellent puddings, very little inferior to plum-puddings.

180. Spiræa salicifolia: *Willd.* ii. p. 1055. *Pursh.* i. p. 341. (W.)

181. Rosa blanda: *Willd.* ii. p. 1065. *Pursh.* i. p. 344. Ogganee-ahtick, *Cree Lang.* (W.)

182. Rubus idæus β. Canadensis: *Willd.* ii. p. 1081. *Pursh.* i. p. 346. (W.)

183. R. saxatilis β. Canadensis: *Mich. Am.* i. p. 298. (W.)

The fruit of this and the preceding species is termed by the Crees, Athouscan.

184. R. pistillatus: *Smith, Exot. Bot.* ii. p. 53, t. 86. *Pursh.* i. p. 349. (W.)

185. R. Chamæmorus: *Willd.* ii. p. 1090. *Pursh.* i. p. 349. (W. B.)

186. Fragaria Canadensis: *Mich. Am.* i. p. 299. Otei-meena (Heartberry), *Cree Lang.* (W.)

187. Potentilla fruticosa: *Willd.* ii. p. 1094. *Pursh.* i. p. 355. (W. B.)

188. P. Pensylvanica: *Willd.* ii. p. 1099. *Pursh.* i. p. 356. (W.)

189. P. arguta: *Pursh.* ii. p. 736. *Lehm. Monogr.* p. 62. (W.)

Viscido-villosa, flore albo, unguibus citrinis. Planta olim in horto Kewensi culta et ut videtur teste Herb. Banks. cum P. Pensylvanica confusa.

190. P. Norwegica: *Willd.* ii. p. 1109. *Pursh.* i. p. 354. (W.)

191. P. anserina: *Willd.* ii. p. 1095. *Pursh.* i. p. 356. (W.)

192. P. concinna: foliis septenatis quinatisque; foliolis ovali-obovatis subtus niveo-tomentosis: apicibus serratis, caule abbreviato. (C.)

Caules plures bi-pollicares diffusi, uti et petioli et pedunculi sericeo-argentei. *Folia* radicalia 7-vel quinata, petiolis sericeis ex basibus brunneis membranaceis 5-nervosis orientibus: stipulæ adnatæ, membranaceæ lanceolatæ acuminatæ integerrimæ, dorso et apice pilosis. *Foliola* sessilia ovali-obovata

interdum fere truncata, ad apicem inequaliter serrata ; supra flavescenti-viridia, pilis adpressis subsericeis densè obtecta, subtus pulchrè niveo-tomentosa, ad margines pilis mollibus exsertis hirsuta: exteriora minora. Folium unicum prope basin caulis sæpius ternatum. Adsunt quoque ad originem pedunculorum foliola duo opposita simplicissima sericea stipulis insidentia. *Pedunculi* 2-3, unguiculares, ascendentes dum terni laterales medio bibracteati, tertius nudus. *Calyces* villosi, laciniis exterioribus brevioribus linearibus acutis ; interioribus triplo latioribus semi-ovatis acuminatis corollam vix æquantibus. *Petala* flavissima latè obcordata. *Germina* lævia, receptaculo hirsuto. Species pulchra. P. humifusam *Nuttallii* non vidi, sed à plantâ nostrâ diversa videtur propter caules flagellatos et non foliosos.

193. P. nivea : *Willd.* ii. p. 1109. *Pursh.* i. p. 353. (B.)

194. P. hirsuta : *Nestl. Monogr.* p. 67. t. 9. P. Monspeliensis. *Willd.* ii. p. 1109. (S.)

195. P. tridentata: *Willd.* ii. p. 1110. *Pursh.* i. p. 353. (W.)

196. P. biflora : *Lehman. Monogr.* p. 192. No. 88. t. 20. (B.)

Dense cæspitosa. *Folia* gramineo-viridia subtus glauca, marginibus revolutis, apicibus fuscis. *Flos* erectus plerumque solitarius sæpe tamen flores duo terminales, pedicellis brevibus villosis ebracteatis ex axillis foliorum caulinorum. *Calyx*, laciniis exterioribus linearibus, marginibus revolutis, utrinque rotundatis subtusque glaucis ; interioribus longitudine æqualibus, duplo latioribus ovatis, acuminatis planiusculis. *Petala* calyce duplo grandiora, obcordata citrino-flava ad unguem maculâ aurantio-flavâ ornata. *Styli* flavi subulati, curvi, staminibus breviores. *Receptaculum* dense villosum, germinibus rugulosis.

197. Geum triflorum: *Pursh.* ii. p. 736. *Nuttall.* i. p. 309. (C.)

198. G. strictum: *Willd.* ii. p. 1113. *Pursh.* i. p. 351. (W.)

199. Dryas chamædrifolia : *Pers. Ench.* ii. p. 57. *Pursh.* i. p. 350. (W.)

200. D. integrifolium: *Pers. Ench.* ii. p. 57. (B.)

201. Comarum palustre : *Willd.* ii. p. 1119. *Pursh.* i. p. 357. (W.)

POLYANDRIA.

202. Actæa brachypetala: *Decand. Syst.* i. p. 385. A. Americana: *Pursh.* ii. p. 366. (W.)

203. Papaver nudicaule : *Willd.* ii. p. 1145. *Pursh.* ii. p. 365. (B.)

204. Sarracenia purpurea : *Willd.* ii. p. 1150. *Pursh.* ii. p. 367. (W.)

205. Nuphar lutea : *Pursh.* i. p. 369. (W.)

206. Aquilegia vulgaris : *Willd.* ii. p. 1245 ? (W.)

207. Thalictrum corynellum : *Decand. Syst.* i. p. 1172? Th. Cornuti : *Pursh.* ii. p. 388 ? (W.)

208. Anemone Nuttalliana: *Decand. Syst.* i. p. 193. A. Ludoviciania : *Nutt. Am.* ii. p. 20. (W. C.)

209. A. parviflora: *Decand. Syst.* i. p. 200. *Mich. Am.* i. p. 319. (W. B.)

210. A. ranunculoides? var : *Decand. Syst.* i. p. 206? (H. B.)

Involucri foliola latè obovata vix in petiolos attenuata.

211. An. borealis: foliis ternatis: segmentis rotundatis dentatis crenatisve; involucralibus amplexicaulibus trifidis, petalis 6 obovatis. (B.)

Radix fibroso-fasciculata, fuscescens.—*Folia radicalia*, petiolata, ternata, glaberrima, *foliolis* sessilibus, cuneiformi-rotundatis, inæqualiter crenatis aut etiam inciso-dentatis. *Petiolus* tener debilisque pollicaris, interdum prope laminam folii pilis paucis mollibus indutus. *Scapus* palmaris, uniflorus, infra involucrum, laxè, supra densè villosus. *Involucrum* foliaceum amplexicaule, subtus pilosum et ad basin villosum, profundè 3-vel 4-partitum, segmentis trifidis, laciniis lineari-obovatis, integerrimis aut cuneiformibus et apice obtusissime, 3-dentatis. *Flos* albidus, extus in junioribus præcipue ad basin cœrulescens. *Petala 6* unguicularia, obovata, obtusissima, plerumque emarginata, juniora extus pube brevî, lanatâ, induta: in maturioribus pili adpressi tantum adsunt. *Stamina* permulta, petalis triplo breviora. *Germina* pilosa.

212. A. Hudsoniana: foliis radicalibus multipartitis, segmentis bis palmatim sectis, laciniis linearibus: involucri ternatim decompositis breviter petiolatis, pedunculis binis, petalis 5-8 ovatis, acutiusculis. (W.)

A. multifida β. Hudsoniana. *Decand. Syst. Vegetab.* i. p. 209.

Herba fere cubitalis, erecta, pilis albis mollibus longiusculis undique munita. *Folia radicalia* petiolata, caule duplo breviora, tripartita: *segmenta* basi attenuata, lateralia bipartita, omnia bis palmatim secta: *laciniis ultimis* lineari-lanceolatis. *Involucrum* trifolium, foliis modo radicalium ternatim decompositis et in petiolos latos breves attenuatis. *Pedunculi* spithamæi, pube brevi densius tecti, plerumque bini, quorum unus præcocior nudus, alter involucellum bifolium trifidum medio gerens. *Flores* parvi, intus melleo-flavi, extus ad basin paulo fuscescentes. *Petala* 5-9 ovata, acutiuscula, extus villosa. *Stamina* petalis plus duplo breviora. *Germina* hirsuta, stylo persistente, recto, glabro mucronata, in capitulum ovatum densè aggregata: matura lanâ involuta quâ dispersa sunt.

β. Sanguinea: An. sanguinea: *Pursh. ined. in Herbario Lambert.*

A precedenti differt statura graciliori, floribusque minoribus saturatè sanguineis. (W.)

213. A. Pensylvanica: *Decand. Syst. Veg.* i. p. 209. A: aconitifolia. *Mich. Fl. Am.* i. p. 320. (S.)

214. Ranunculus flammula var.? *Decand. Syst. Veg.* i. p. 247. (W.)

215. R. cymbalaria: *Pursh.* i. p. 392. var. β. *Decand. Syst. Veg.* i. p. 252. (W.)

β. minima; foliis plerumque 3-dentatis, flagellis paucis vel nullis. (W.)

216. R. rhomboideus: *Edin. Phil. Journ.* vi. p. 329. t. xi. f. 1. R. ovalifolius. *Pursh. inedit. in Herbario Lambert.* (C.)

217. R. arcticus: foliis radicalibus petiolatis hastatis tripartitis lobis divisis; caulinis in lobos lineares integerrimos partitis, caule trifolio unifloro, calyce villoso petalis breviore. (B.)

Folia glaberrima; *radicalia* longius petiolata, hastata, tripartita; *lobo intermedio* unguiculari trifido, laciniis lateralibus minoribus, patentibus; *lobis lateralibus* 4-partitis segmentis divaricatis, exterioribus sensim minoribus: laciniis omnibus obtusis, lanceolatis vel linearibus; *caulina* in lobos lineares integerrimos, obtusiusculos partita, ad bases membranacea, amplexicaulia et pilis albis mollibus ciliata: imum sub-petiolatum lobis sex, summum lobis tribus. *Caulis* simplicissimus pedalis erectus uniflorus, foliis tribus remotis munitus et supra folium summum pilis albis villosiusculus. *Calyx* flavescenti-erubescens, villosus, reflexus, petalis dimidio brevior. *Petala* lutea patentissima, obovata, obtusissima, receptaculo breviora. *Stamina* filamentis brevissimis, antheris oblongis. *Germina* glabra stylo recurvato mucronata, receptaculo cylindraceo.

218. R. Pensylvanicus: *Decand. Syst. Veg.* i. p. 290. *Pursh.* ii. p. 393. (W.)

219. R. Purshii: glaberrimus, foliis petiolatis: depressis ternatim decompositis; elevatis bis terve palmatim trifidis, caule repente, petalis calyce glaberrimo triplo longioribus. R. Fistulosus: *Pursh. inedit. in Herb. Lambert.* (W. B.)

Caules teretes filiformes teneri super arenas irrigatas implexè repentes, scendentes. *Folia* nonnulla *depressa* ternatim decomposita, laciniis divaricatis, linearibus acutis ; alia *elevata* sub-reniformia, laciniis divaricatis, cuneatis apice dentatis incisisve, lateralibus sæpe trifidis ; segmentis omnibus glaberrimis utrinque concoloribus marginibusque erubescentibus. *Petioli* basi amplexicaules, trinerves et membrana teneri, rotundata, integra, ciliata aucti. *Pedunculus* unus præcocior nudus, non sulcatus caulem quasi terminans et internodium proximum longitudine et crassitudine fere æquans, folioque oppositus : alter axillaris; brevis uniflorus vel sæpe biflorus foliosus et mox elongaturus. *Calyx* glaberrimus reflexus foliolis tribus quaternisve sub-membranaceis, nervis tribus quatuorve ramosis, concavis fere saccatis, deciduis. *Petala* 5-6 saturatè flava, latè elliptica, obovatave obtusissima, 5-nervosa, nitentia, subtus opaca, calyce triplo longiora, unguibus brevibus, porisque nectariferis patelliformibus margine elevato circumcinctis. *Semina* sublenticularia, glabra, stylo brevi compresso terminata.

β. Margines rivulorum arenosas sicciores habitans, differt foliis omnibus reniformi-rotundatis, palmato-trifidis, laciniis divaricatis, cuneatis, apice dentatis, incisisve segmentis obtusis. R. hyperboreo affinis, sed flore differt. (B.)

220. R. Lapponicus : *Decand. Syst. Veg.* i. p. 271. (W.)

221. R. pygmæus : *Decand. Syst. Veg.* i. p. 273. *Pursh.* i. p. 393. (A.)

222. R. sulphureus . *Phipps, Voyage.* p. 202. *Decand. Syst. Veg.* i. p. 274. (B.)

223. R. sceleratus : *Decand. Syst. Veg.* i. p. 268. *Pursh.* i. p. 293. (W.)

224. Caltha palustris ; *Willd.* ii. p. 1339. *Pursh.* i. p. 390. (W.)

225. C. natans : *Gmel. Fl. Sibir* : iv. t. 82. *Willd.* ii. p. 1339. (W.)

DIDYNAMIA.

226. Mentha Canadensis : *Pursh.* ii. p. 405. *Amiscuicuscoa* (beaver-grass.) *Cree Lang.* (W.)

227. Stachys ambigua : *Smith. Comp. Fl. Brit.* p. 91. *Eng. Bot.* t. 2089. (W.)

228. Dracocephalum ? parviflorum : *Nuttall. Am.* ii. p. 35. (W. C.)

229. Scutellaria galericulata : *Willd.* iii. p. 173. *Pursh.* ii. p. 412. (W.)

230. Euphrasia officinalis : *Willd.* iii. p. 193. *Pursh.* ii. p. 430. (H.)

231. Bartsia pallida : *Willd.* iii. p. 186. *Pursh.* ii. p. 429. (W. B.)

232. Rhinanthus crista-galli : *Willd.* iii. p. 188. *Pursh.* ii. p. 429. (H.)

233. Pedicularis macrodontis : caule sub-simplici, foliis pinnatifidis : pinnis linearibus obtusis, calycibus bilobis cristatis, galeâ obtusissimâ ad faucem dentata. (H.)

Herba glabra. *Caulis* pedalis et ultra, erectus gracilis plerumque simplex interdum tamen ramulos superne ex axillis foliorum prodiens. *Folia* remotiuscula, fere sesquipollicaria, acuminata profunde pinnatifida ; pinnis patentissimis linearibus obtusis, sinuato-dentatis crenatisve. *Flores* axillares sessiles foliis floralibus interdum plus duplo breviores. *Flos* fère P. palustris. *Calyx* ovatus inflatus, corolla duplo brevior. *Galea* obtusissima nec emarginata et dentibus sub apice carens, ad faucem tamen dente majusculo angulo recto stante utrinque munita. *Labium* inferius galea sub-brevius, 3-lobum, lobis sub æqualibus integerrimis.

234. P. euphrasioides, β. Labradorica : *Willd.* iii. p. 204. *Pursh.* ii. p. 424. (W. B.)

235. P. flammea : *Willd.* iii. p. 215. *Pursh.* ii. p. 246. (B.)

236. P. Lapponica : *Willd.* iii. p. 207. *Pursh.* ii. p. 245. (B.)

237. P. sudetica : *Willd.* iii. p. 209. (B.)

238. P. hirsuta: *Willd.* iii. p. 216. *Brown, Ross's Voyage.* (B.)

239. P. Nelsonii: *Brown. MS. in Herb. Banks.* P. verticillata. *Pursh.* ii. p. 426. (B.)

240. Linnæa borealis: *Willd.* iii. p. 340. *Pursh.* ii. p. 415. (W.)

TETRADYNAMIA.

Pleurorhizeæ. Decand.

241. Nasturtium palustre: *Decand. Syst.* ii. p. 191. Sisymbrium palustre: *Pursh.* ii. p. 240. (W.)

242. Barbarea præcox; *Decand. Syst.* ii. p. 207. (W.)

243. Braya? glabella: foliis linearibus plerumque remote dentatis, racemo fructifero laxo elongato. (B.)

Radix fusiformis ad collum in caudices paucos breves reliquiis foliorum obtectos divisa. *Folia* subradicalia fere bipollicaria erecta, è basi tenui lineare sursum lanceolatim dilatata, acuta, medium versus dentibus 2 vel 3 acutis sæpe instructa, utrinque concolora, glabriuscula, costa obsoletiori percursa sed venis nullis transparentibus. *Caules* palmares erecti costati pube bifida rarissimà muniti: alii scapiformes ex ipsa radice, alii e summo surculorum brevium foliosorum exsurgentes, rarius folio uno alterove radicalibus simili, instructi. *Racemus* elongatus, pedunculis erectiusculis calyces æquantibus. *Flores* parvi. *Laciniæ calycinæ* erectæ, lineares, obtusæ, glabræ. *Petala* (exsiccata) pallidè purpurascentes, limbis obtusis integerrimis calycem duplo altioribus. *Stylus* filiformis brevis stigmate sub-capitato emarginato. *Siliquæ* immaturæ sub-erectæ calyce persistente triplo longiores, torulosæ, stylo coronatæ.

Hab. On the Copper Mountains.

244. Turritis glabra: *Decand. Syst.* ii. p. 211. W.)

245. Arabis sagittata: *Decand. Syst.* ii. p. 221. Turritis ovata: *Pursh.* ii. p. 438. (W.)

246. A. hispida: *Brown. Hort. Kew.* iv. p. 106. A. petræa, β. *Decand. Syst.* ii. p. 230. (B.)

247. A. lyrata: *Decand. Syst.* ii. p. 231. *Pursh.* ii. p. 437. (W.)

248. Cardamine pratensis: *Decand. Syst.* ii. p. 256. *Pursh.* ii. p. 440. (H. A. W.)

249. C. hirsuta: *Decand. Syst.* ii. p. 259. (W.)

250. C. digitata: foliis digitatim pinnatis: pinnis sessilibus linearibus integerrimis, stylo brevi vix siliqua tenuiori: stigmate capitato. (B.)

Herba glaberrima. *Folia* digitatim pinnata; *inferiora* petiolo longo gracili, pinnisque 7 approximatis: *superiora* brevius petiolata pinnis paulo remotioribus: *summum* subsessile, pinnis 3 aut 5; *pinnis* omnibus sessilibus conformibus. *Caulis* dodrantalis, simplex, basi repens ascendens, superne erectus sub-flexuosus. *Racemi* erecti, multiflori. Pedicelli siliquis longiores, patentes. *Flores* ferè magnitudine Card. pratensis. *Calyx* flavescens. *Petala* obovata, calyce duplo longiora, alba vel purpureo tincta. *Stylus* crassiusculus lineam longus, stigmate capitato. *Siliquæ* juniores breviusculæ; maturas non vidi.

251. Vesicaria arctica: Alyssum? arcticum: *Decand. Syst.* ii. p. 324. (B.)

252. V. arenosa: foliis inferioribus sub-rhombeis obsolete sinuato-dentatis pube stellatâ canescentibus, caulibus teretibus basi suffruticosis, siliculâ pubescente.

Radix fusiformis. *Folia* radicalia plurima erecta elliptica parciter obsoletèque sinuato-dentata vel non

raro rhomboidea, acuta, in petiolum ipsâ laminâ sesquilongiorem attenuata, utrinque pube stellata adpressa dense tecta, supra flavescenti-viridia subtus canescentia. *Caules* patentes aut ascendentes, firmi, palmares simplices, erubescentes, teretes, pilis stellatis vestiti foliisque paucis magis aut minus linearibus, nunc sessilibus nunc in petiolum attenuatis instructi. *Racemi* terminales. *Pedicelli* flores longitudine æquantes. *Pubescentia* calycis pedicellorumque ut in foliis. *Petala* flava obovata in unguem attenuata, calyce sesquilongiora. *Stamina* edentula. *Stylus* filiformis, stigmate capitato. *Germen* pilosum. *Siliculam* maturam non vidi. Floret Maio.

Hab. On the sandy plains of the Saskatchawan.

253. Draba alpina: *Decand. Syst.* ii. p. 338. *Wahl. Fl. Lapp.* p. 173. t. xi. f. 4. (B.)

254. D. muricella: *Decand. Syst.* ii. p. 340. *Brown. App. Ross's Voyage.* (B.)

255. D. hirta α inferalpina: *Wahl. Fl. Lapp.* p. 175. t. xi. f. 3. *Decand.* ii. p. 340. (B.)

256. D. glabella: *Pursh.* ii. p. 434. (B.)

257. D. lutea β. longipes? *Decand. Syst.* ii. p. 351. (W.)

258. Capsella bursa pastoris: *Decand. Syst.* ii. p. 383. (W.)

Notorhizeæ. Decand.

259. Sisymbrium canescens? *Decand. Syst.* p. 475? *Nuttall. Gen. Am.* ii. p. 68.? (W.)

260. S. brachycarpon: foliis bipinnat'sectis: lobis obtusis integris vel parciter incisis, petalis calyce majoribus, siliquis linearibus sub-tetragonis pedicello brevioribus. (W.)

Facies S. Sophiæ, at facile distinguitur siliquis duplo brevioribus. *Caulis* bipedalis, simplex aut superne corymboso-ramosus, glandulis parvis pedicellatis munitus. *Folia* pinnata, pinnis pinnatifidis, lobis oblongis lanceolatisve, extimis majoribus, glabra aut pube glandulosa munita. *Petala* obovata, pallidè flava, calycem saturatius flavum paulò superantia. *Siliqua* erectiuscula, pedicello patenti brevior vel interdum fere æqualis, teretiuscula sed propter lineam elevatam in axi valvularum subtetragona, stigmate orbiculato terminata, 4 lineas longa, lineam lata.

261. S. Sophia? Var. *Decand Syst.* ii. p. 474? (B.)

Lobis foliorum latioribus obtusis et notis aliis forsan species diversa?

262. Erysimum cheiranthoides: *Decand. Syst.* i. p. 498. *Pursh.* ii. p. 436. (C.)

263. Lepidium ruderale: *Decand. Syst.* ii. p. 540. (H.)

MONADELPHIA.

264. Geranium Carolinianum? *Willd.* iii. p. 711. *Pursh.* ii. p. 449. (W.)

DIADELPHIA.

265. Corydalis glauca: *Pursh.* ii. p. 463. (W.)

266. C. aurea: *Pursh.* ii. p. 463. (W.)

267. Polygala paucifolia: *Willd.* iii. p. 880. *Pursh.* ii. p. 464. (S.)

268. P. Senega: *Willd.* iii. p. 894. *Pursh.* iii. p. 464. (H. W. B.)

269. Lupinus perennis ? Var. foliis magis acutis et cum caule pilosioribus : *Willd.* iii. p. 1022 ? *Pursh.* ii. p. 467 ? (B.)

270. Lathyrus pisiformis ? Varietas ? stipulis folia tantum æquantibus semi-sagittato-cordatis : basi angulato-dentato, cæteris similis. *Willd.* iii. p. 1092 ? (S.)

271. Pisum maritimum : *Willd.* iii. p. 1071. *Pursh.* ii. p. 470. (A.)

272. Vicia americana : *Willd.* iii. p. 1096. *Pursh.* ii. p. 471. (W.)

273. Hedysarum alpinum : *Willd.* iii. p. 1207, a H. alpino *Mich.* diversum.

274. Hedysarum Mackenzii : caulescens decumbens, foliis pinnatis foliolis oblongis utrinque canescenti-pilosis, stipulis vaginantibus, articulis lomenti transversim rugosis pilosis. (B.)

Caulis ulnaris decumbens parciter ramosus, angulatus superne pilis mollibus brevissimis adpressus tectus. *Folia* pinnata cum impari palmaria fere sessilia rachide trilaterali adpresso-pilosâ : foliolis 5-7-jugis, petiolatis sub-oppositis æqualibus sesquipollicaribus oblongis aut ovato-lanceolatis obtusis, utrinque pilis brevibus incanis, venis paucis curvis ramosis obscure transparentibus. *Stipulæ* coalitæ vaginantes parvæ membranaceæ acuminatæ pilosæ. *Pedunculi* axillares foliis duplo longiores caulem crassitudine æquantes superne villosi. *Racemus* 7-10 florus, pedicellis sericeis calycem æquantibus bracteisque suis membranaceis subulatis brevioribus. *Calyx* membranaceus pilosus mox erubescens bracteâ setaceâ adpressâ utrinque fulcratus 5-fidus : laciniis subulatis, superioribus sinu obtusiori separatis. *Corolla* magna speciosa carmesino-rubra purpurascensve. *Vexillum* obcordatum carinam obtusissimam æquans calyceque quintuplo longius. *Alæ* calyce triplo longiores. *Legumen* 5-7 articulis compressis transversim rugosis et pilis brevissimis adpressis vestitis. *Semina* reniformia.

This is the Liquorice-plant mentioned by Sir Alexander M'Kenzie in his *Voyage to the Arctic Sea.*

275. H. boreale ? caulescens erectus, foliis pinnatis foliolis ellipticis obtusis supra glabris subtus canescenti-pilosis, stipulis vaginantibus articulis lomenti glabris. *Nuttall, Am.* ii. p. 110 ?

A H. Mackenzii cui valdè similis diversum foliolis supra glabris minoribus omnino aveniis et proportionibus petalorum relativis. *Caulis* erectus flexuosus glaber brachialis et ultra. *Foliola* pollicaria plerumque elliptica interdum ovato-lanceolata obtusa. *Flores* magnitudine et colore præcedentis. *Carina* vexillo longior, calyce triplo longior. *Alæ* lineari-oblongæ obtusæ vexillo breviores, calyce plus duplo longiores. *Ovarium* glabrum seminulis sex. *Fructum* maturum non vidi.

276. Phaca frigida : *Willd.* iii. p. 1253. *Wahl. Lapp.* p. 188. *Fl. Dan.* t. 856. (W.)

277. Ph. astragalina : *Decand. Astr.* p. 52. Astr. alpinus, *Pursh.* ii. p. 472. (H. W. B.)

278. Oxytropis oxyphylla : *Pall. Astr.* t. 74 ? *Pall. Itin.* iii. t. x. f. 2 ? (W.)

279. O. deflexa : *Decand. Astr.* p. 96. Astragalus parviflorus : *Willd.* iii. p. 1278. (W.)

280. O. campestris : *Decand. Astr.* p. 74. Astr. campestris, *Willd.* iii. p. 1317. (B.)

281. O. argentata : *Pursh.* ii. p. 473. Astr. argentata : *Pall. Astr.* p. 60, t. 48. (C.)

282. O. uralensis: *Decand. Astr.* p. 69. Astr. uralensis, *Hort. Kew.* iv. p. 370. Phaca sordida: *Wahl. Fl. Lapp.* p. 190. (A.)

283. Astragalus melanocarpus: *Frazer's Catalogue.* A. Missouriensis: *Nuttall*, ii. p. 99? exclus. syn. Pursh ii. A. Setosus: *Pursh inæd. Herb. Lamb.* (C.)

284. A. vaginatus: *Pall. Astr.* p. 76, t. 36. (B.)

285. A. aboriginorum: suffruticosus erectus canescens, foliis sessilibus, foliolis 6-jugis lanceolato-linearibus, racemis axillaribus laxis foliis longioribus. (C.)

Præcedenti similis. Radix teres longa flavescens Glycirrhizæ similis è quo surgunt caules plures pedales suffruticosi erecti graciles simpliciusculi pilis mollibus canescentes. *Folia* sessilia pinnata, pube canescenti ut in caule sed longiori et densiori: rachide bipollicari filiformi; foliolis plerumque 11, pollicaribus, sessilibus, linearibus lanceolatisve obtusiusculis basi attenuatis utrinque concoloribus nunc alternis nunc oppositis rariusve verticillatis; stipulis caulinis: inferioribus connatis ovatis acutis; superioribus magis distinctis acuminatis. *Pedunculi* axillares foliis duplo longiores pilosi. *Racemus* erectus laxus 15-20 florus, pedicellis erectis calyce et bracteâ subulatâ pilosâ brevioribus. *Calyx* nigrescenti-pilosus, laciniis quinque subulatis æqualibus: superioribus sinu obtuso separatis. *Corolla* albida cærulescensve carinâ eminente cæruleâ. *Vexillum* ungue lato horizontali calyce breviori, limbo obcordato erecto. *Alæ* vexillo breviores carinâ paulo longiores, ungue tenui lineari, limbo oblongo emarginato ad basin lobo lineari obovato aucto. *Carina* obtusa calyce tertia parte longior. *Legumen* immaturum oblongum, pilis canis adpressis tectum, pedicello longitudine calycis sustentatum, stylo brevi incurvo capitato terminatum. *Semina* 14.

The Crees and Stone Indians gather its roots in the spring, as an article of food.

286. A. hypoglottis: *Willd.* iii. p. 1285. *Nutt. Am.* ii. p. 99. (S.)

287. A. succulentus: caulescens decumbens glabriusculus, foliolis ovalibus obtusis, stipulis glabris triangularibus, spicis pedunculatis folio brevioribus. (C.)

Herbaceus spithameus glabriusculus vel pilis adpressis vix conspicuis deciduis munitus. *Caulis* decumbens sub-angulatus superne crassior. *Folia* sessilia rachide bi-pollicari sub-trilaterali superne attenuatâ, foliolis 21 trilinearibus, ovalibus obtusissimis aveniis brevissime ciliatis supra glabra subtus pilis sparsis inconspicuis munitis; foliolis exterioribus paulo minoribus; *stipulis* caulinis triangularibus integerrimis glabris viridibus, basibus infra petiolum connatis ibique costis tribus decurrentibus munitis. Folia basin versus caulis breviora foliolisque minora. *Pedunculi* foliis breviores, axillares, crassi. *Spica* sub-decemflora conferta. *Flores* magni ochroleuci, carinæ apice purpurascenti, bracteis membranaceis suffulti. *Calyx* subsessilis cylindricus membranaceus pallescens, inferne glaber, superne pilis sparsis munitus, dentibus subulatis sinubus obtusis separatis. *Vexillum* alis quartâ parte longius, oblongum, acute emarginatum, lateribus replicatis. *Alæ* carina tertia parte, calyce duplò longiores, ungue tenui, limbo lineari-oblongo integerrimo obtuso inferne lobo brevi obtuso aucto. *Germina* glabra polysperma, stylo longo ad apicem incurvo acuminata. Fructum maturum non vidi.

SYNGENESIA.

288. Leontodon palustre: *Smith. Fl. Brit.* ii. p. 823. *Eng. Bot.* t. 553. (W. B.)

289. Troximon glaucum: *Pursh.* ii. p. 505. (S.)

290. Hieracium prenanthoides: *Willd.* iii. p. 1590. *Nuttall. Gen. Am. Pl.* ii. p. 125. *exclud. syn. Purshii.* (B.)

291. Crepis? nana: glaberrima, foliis ovatis integerrimis, pappo sessili. (B.)

Herba glauca sesquipollicaris multiflorus. *Radix* fusiformis simplex caules plures brevissimos decumbentes alens. *Folia* radicalia confertissima ovata integerrima trinervia glaberrima supra olivaceo-viridia, subtus rubescenti-viridia, petiolis caules pedunculosque superantibus. *Caules* reliquiis foliorum obtecti in pedunculos vel ramos corymbosos uniflores foliis paucis linearibus munitos divisi. *Calyx* gracilis cylindricus calyculatus pedunculo vel ramo suo longior ; squamis exterioribus brevibus linearibus adpressis diversæ altitudinis : interioribus æqualibus carinatis glaberrimis. *Flosculi* saturatè flavi calyce altiores lineares 5-dentati. *Semina* linearia supernè paulo attenuata pappo sessili simplice scabriusculo coronata.

Hab. On the Copper-Mine River.

292. Saussuria multiflora ? *Decand. An. du Mus.* tom. xvi. p. 199? exclud. synon. Lin. (B.)

293. Sonchus sibiricus : *Willd.* iii. p. 1522. (W.)

294. Tanacetum pauciflorum : foliis bi-pinnatis villosis sessilibus, caule simplici foliis longiore subunifloro, flosculis omnibus hermaphroditis. *MS. in Herb. Banks.* (S.)

Ulnaris. Folia bi-pinnata et tripinnatifida, laciniis angustis obtusiusculis. Flos plerumque unicus terminalis interdum alter è suprema axilla.

295. Artemisia virgata : frutescens sericeo-incana, ramis erectis gracilibus, foliis capillaceis bi-pinnatifidis : floralibus simplicibus calyce hemispherico villoso longioribus. (W.)

Odor Art. Abrotani cui habitu similis sed foliis duplo minoribus.

296. A. campestris : *Willd.* iii. p. 1827. *Pursh.* ii. p. 521. (W.)

297. A. borealis : *Willd.* iii. p. 1839. *Pall. Itin.* iii. p. 755. t. H. h. f. 2.
A. spithamæa? *Pursh.* ii. p. 522? (B.)

298. A. vulgaris : *Willd.* iii. p. 1845. *Pursh.* ii. p. 522. (B.)

299. A. integrifolia : *Willd.* iii. p. 1846. *Gmel. Sibir.* t. 48. f. 1. *Pursh.* ii. p. 521. (W.)

300. Gnaphalium plantagineum : *Pursh.* ii. p. 525. G. plantinaginæfolium : *Willd.* iii. p. 1882. (W.)

301. G. dioicum : *Willd.* iii. p. 1882. (W.)

302. G. alpinum : *Willd.* iii. p. 1883. *Pursh.* ii. p. 524. (B.)

303. Erigeron pulchellum : *Mich. Am.* ii. p. 224. E. bellidifolium : *Pursh.* ii. p. 532. E. serpentaria : *Herb. Banks. MSS.* (S.)

304. E. purpureum : *Willd.* iii. p. 1958. *Pursh.* ii. p. 533. (S.)

305. E. philadelphicum : *Willd.* iii. p. 1957. *Pursh.* ii. p. 533. (W.)

306. E. glabellum : *Nuttall. Am.* ii. p. 147. (W.)

307. E. uniflorum : *Willd.* iii. p. 1960. *Eng. Bot.* t. 2416. (A.)

308. Senecio pauciflorus : *Pursh.* ii. p. 529. (S.)

309. S. gracilis : *Pursh.* ii. p. 529. (W.)

310. S. balsamitæ : *Willd.* iii. p. 1998. *Pursh.* ii. p. 530. (W.)

311. S. aureus : *Willd.* iii. p. 1998. *Pursh.* ii. p. 530. (W.)

312. S. lugens : tomentosus, foliis integris glanduloso-dentatis : radicalibus sub-spatulatis : caulinis linearibus acutis, caule simplici, corymbo denso. (B.)

Herba pedalis, ubique parciter lanosa. *Caules* plures ex eodem radice, simplices costati, erubescentes. *Folia* adeo crassa ut venæ nullæ transparent plana nec ullo modo ensiformia nihilominus costâ erubescenti validâ sub apice evanidâ munita: *radicalia* primordialia palmaria spatulata et obtusissima; mox exsurgunt alia versum apicem elliptica vel lanceolata et acuta, basibus tamen semper angustis et nil nisi costas alatas exhibentibus: *caulina* minora, remota, sessilia, semi-amplexicaulia lanceolato-linearia, acuminata, acuta, summa in bracteis sensim diminuta: *omnia* dentata, dentibus nunc raris et ex glandulis parvis acutis omninò formatis, nunc frequentioribus et ex substantia folii constructis sed tunc etiam glandulis apiculatis. Folia juniora interdum revoluta sunt. *Corymbus* terminalis circiter 10-florus, pedunculis calyce vix duplo longioribus, tomentosis, bracteis linearibus acuminatis suffultis. *Calyx* cylindricus squamis paucis laxis minoribus calyculatus. Squamarum apices nigerrimæ. *Floruli* disci calyce longiores, antheris stigma superantibus. *Flosculi* radii patentes calyce duplo longiores, limbis lanceolatis integerrimis vel emarginatis. *Pappus* simplex sessilis. *Receptaculum* nudum.

Hab. At Bloody Fall, where the Esquimaux were destroyed by the Northern Indians that accompanied Hearne, whence the specific name.

313. Cineraria integrifolia: *Willd.* iii. p. 2082. *Pursh.* ii. p. 528. (H.)

314. C. palustris: *Willd.* iii. p. 2080. (H. W. A.)

315. C. frigida: deciduo-tomentosa, foliis ovatis obsoletè dentatis: radicalibus petiolatis, caule ascendente unifloro. (B.)

Radix repens. *Caulis* palmaris et ultra, simplex striatus, uniflorus tomento laxo deciduo vestitus. *Folia* plerumque ovata obtusa remote obsoleteque dentata 3-vel 5-nervosa, marginibus sub revolutis; *subradicalia* minora, glabra, in petiolum longum attenuata; *caulina media* majora tomento ut in caule vestita; *caulina suprema* minora, linearia. *Flos* luteus. *Calyx* simplex pilis glanduliferis villosus, laciniis linearibus acutis longitudine disci. *Flosculi* radii calyce duplo longiores 3-dentati.

316. C. Lewisii: Erigeron compositum: *Pursh.* ii. p. 535. (B.)

317. Aster? exscapus: foliis radicalibus lineari-lanceolatis adpresso pilosis flore sessili altioribus. (C.)

Radix fusiformis superne in caudices breves crassos reliquiis foliorum obtectos divisa. *Folia* radicalia sesquipollicaria angusta acuta, inferne sensim attenuata, integerrima, utrinque pilis adpressis vestita. *Flos* magnus albidus in summo caudicis sessilis foliisque paulo brevior. *Calyx* adpresso-imbricatus, laciniis angustis lineari-subulatis acutis marginibus membranaceis ciliatis. *Flosculi* disci calyce paulo longiores pappo breviores. *Fl. radii* calyce plus duplo longiores angusti, lineares apice dentibus 3 conniventibus.

Hab. at Carlton House.

318. A. salicifolius: *Willd.* iii. p. 2030. *Pursh.* ii. p. 549. (W.)

319. A. graminifolius: *Pursh.* ii. p. 545. (H.)

320. A. paludosus: *Willd.* iii. p. 2033. *Pursh.* ii. p. 551. (H.)

321. A. paniculatus: *Willd.* iii. p. 2035. *Pursh.* ii. p. 551. (W.)

322. A. cordifolius: *Willd.* iii. p. 2036. *Pursh.* ii. p. 552. (W.)

323. A. salsuginosus: caule unifloro, foliis lineari-obovatis acutis sub-integerrimis venosis, calycibus laxè imbricatis linearibus acutis disco vix duplo radio plus triplo brevioribus. (W.)

Herbaceus. *Caules* plures ex eadem radice, dodrantales erecti aut ascendentes firmi simplices purpurei sed pilis brevissimis sub-incanis. *Folia* sessilia lineari-obovata lanceolatave plerumque acuta, integerrima

vel ad apicem dentibus raris munita, venosa, utrinque concolora, supra glabra, subtus pilis brevibus patentissimis vestita. *Flos* magnus terminalis infra quem caulis paulo incrassatus est et villosus. *Calyx* laxiusculus pilis brevibus canis obtectus, laciniis linearibus acutis, marginibus purpurascentibus. *Flosculi disci* calyce fere duplo longiores: *radii* triginti sesqui-unguiculares disco duplò longiores, lineares subemarginati. *Germina* hirta pappo simplici dentato fuscescente discum æquante coronata.

Hab. On the Salt Plains in the Athabasca.

324. A. montanus: radice repente, caule ramoso sub-bifloro ad apicem densè tomentoso, foliis latè oblongis remotè dentatis subtus breviter pilosis, calycibus squarrosis, flosculis radii numerosis angustis. (B.)

Radix repens. *Caules* plures spithamei ascendentes simplices aut ramosi firmi sulcati villoso-canescentes ramis plerumque sterilibus. *Folia* sesquipollicaria apicem versus remotè dentata, subtusque pilosa, varia, modo latè lanceolata acuta, modo lincari-oblonga obtusa sed costa excurrente apiculata. *Flos* magnitudineErigerontis alpini, terminalis propè quem caulis incrassatus est et tomento incano densissimè obtectus. *Calyx* villosus laciniis lineari-lanceolatis acutis imbricatis squarrosis, interioribus purpurascentibus radium sub-æquantibus. *Flosculi* disci calyce breviores; *radii* subtriginti angusti lineares sub-emarginati calyce paulo longiores. *Germina* pilosa, pappo simplici dentato fuscescente disco longiori. Specimen hujus plantæ è Sibiria in herbario Pallasii nunc Lambertiano sub nomine falso Erigerontis alpini conservatum est. Asteris species propter calycem potius quam Erigerontis.

325. Solidago tenuifolia: *Pursh*. ii. p. 540. (H.)

326. S. virga-aurea: *Willd*. iii. p. 2065. *Pursh*. ii. p. 542. (W.)

327. S. stricta: *Willd*. iii. p. 2062. *Pursh*. ii. p. 540. (W.)

328. S. juncea: *Willd*. iii. p. 2060. *Pursh*. ii. p. 538. (W.)

329. S. procera: *Willd*. iii. p. 2055. *Pursh*. ii. p. 535. (H.)

330. S. lanceolata: *Willd*. iii. p. 2062. *Pursh*. ii. p. 540. (H.)

331. S. humilis: *Pursh*. ii. p. 543. (W.)

332. Arnica montana: *Willd*. iii. p. 2106. *Nuttall. Gen. Am*. ii. p. 164. (W.B.)

333. Grindelia squarrosa: *Brown, Lin. Trans*. v. xii. p. 102. Donia squarrosa: *Pursh*. ii. p. 559.

Hab. On the Salt Plains in the Athabasca.

334. Tussilago palmata: *Willd*. iii. p. 1972. *Pursh*. ii. p. 531. (W.)

335. T. frigida: *Willd*. iii. p. 1968. *Pursh*. ii. p. 531. (A.)

336. T. sagittata: *Pursh*. ii. p. 531. (W.)

337. Chrysanthemum integrifolium: pilosum, foliis linearibus integerrimis, caule sub-aphyllo unifloro.

Radix gracilis perennis. *Folia* radicalia conferta, ferè pollicaria, linearia, obtusiuscula integerrima pilosa. *Caulis* simplicissimus, digitalis, superne incrassatus, pilis mollibus patentissimis densè tectus et interdum folio uno alterove fere setaceo instructus. *Flos* pro ratione plantæ magnus. *Calyx* hemisphæricus imbricatus, squamis elliptico-obovatis, appressis, viridibus, marginibus membranaceis laceris umbrino-fuscis. *Flosculi radii* albi, magni, latè elliptici 3-dentati; *disci* lutei. *Receptaculum* pilosiusculum. C. graminifolio *Lam. Ill.* t. 678. f. affinis. *Hab.* On the Copper Mountains.

338. Achillea ptarmica: *Willd*. iii. p. 2191. *Pursh*. ii. p. 562. (W.B.)

339. A. millefolium: *Willd*. iii. p. 2208. *Pursh*. ii. p. 563. (W.B.)

GYNANDRIA.

340. Habenaria obtusata : Orchis obtusata : *Pursh*. ii. p. 588. (H.)

341. H. hyperborea : *Brown. Hort. Kew*. v. p. 193. Orchis hyperborea : *Pursh*. ii. p. 588. (W.)

342. H. rotundifolia : Orchis rotundifolia : *Pursh*. ii. p. 588. (W.)

343. Neottia cernua : *Willd*. iv. p. 75. *Pursh*. ii. p. 589. (B.)

344. Corallorhiza innata : *Brown. Hort. Kew*. v. p. 209. *Nuttall. Gen. Am*. ii. p. 197. (W.)

345. Cypripedium parviflorum : *Willd*. iv. p. 143. *Pursh*. ii. p. 594. (W.)

346. C. pubescens : *Willd*. iv. p. 143. *Pursh*. ii. p. 594. (W.)

347. C. humile : *Willd*. iv. p. 144. *Pursh*. ii. p. 595. (W.)

MONŒCIA.

348. Chara translucens : *Eng. Bot*. t. 1855. (B.)

349. Typha latifolia ? *Pursh*. i. p. 34 ? (W.)

350. Kobresia scirpina : *Willd*. iv. p. 205. (B.)

Carex. 1. *Spicis dioicis.*

351. C. dioica : *Willd*. iv. p. 207. (W.)

352. C. scirpoidea : *Mich. Am*. ii. p. 171. *Pursh*. i. p. 34. C. Wormskioldiana : *Hornemann. Fl. Dan*. t. 1528. (W.)

2. *Spica androgyna simplici, arista stricta (vel exserta vel inclusa.)*

353. C. filifolia : *Nutt. Am*. ii. p. 204. (C.)

3. *Spica androgyna simplici mutica.*

354. C. affinis : spica androgyna simplici superne mascula, stigmatibus tribus, squamis lanceolatis acutis muticis ; infima aristata. *Brown, MS*. (W.)

Obs. Proxima C. polytrichoidi. *Br.*

355. C. attenuata : spica androgyna simplici : superne mascula densa : femineis paucioribus alternis, squamis omnibus obtusis. *Brown, MS*. (B.)

4. *Spicis androgynis pedunculatis.*

356. C. media : spicis androgynis ternis brevissimè pedunculatis sessilibusve approximatis basi masculis, stigmatibus tribus, capsulis ovatis rostellatis glaberrimis squama ovata obtusiuscula longioribus. *Brown, MS*. (W.)

Prope C. bicolorem. *Br.*

357. C. fuliginosa : *Sternb. et Hoppe. in Act. Soc. Bot. Ratisb*. i. p. 159, t. 3. (B.)

5. *Spicis androgynis sessilibus alternis.*

358. C. scoparia : *Willd*. iv. p. 230. *Pursh*. i. p. 37. (W.)

359. C. loliacea : *Willd*. iv. p. 237. (W.)

360. C. remota ; *Willd*. iv. p. 239. *Pursh*. i. p. 37. (W.)

6. *Spicis sexu distinctis, mascula solitaria, femineis subsessilibus scapo nudo bracteisque membranaceis vaginatis.*

361. C. Richardsonii: spica mascula pedunculata, femineis binis alternis subsessilibus exsertis multifloris, stigmatibus tribus, fructibus obtusis pubescentibus. *Brown, MS.* (W.)

7. *Spicis sexu distinctis, mascula solitaria, femineis sessilibus s. incluse pedunculatis.*

362. C. concinna: spica mascula sessili cylindracea, femineis ternis subsessilibus approximatis, bracteis semimembranaceis, stigmatibus 3, capsulis trigono-obovatis brevissimè rostellatis pubescentibus duplo ferè longioribus squamis obovatis, foliis caulinis superioribus abbreviatis. *Brown, MS.* (W. B)

Affinis C. marginatæ, quæ diversa spica mascula majori, femineis binis brevioribus, squamis obtusiusculis capsulam subæquantibus. *Br.*

363. C. varia: *Willd.* iv. p. 259. *Pursh.* i. p. 40. (C.)

364. C. compacta: *Brown, App. Ross's Voyage.* (B.)

Obs. Prope C. saxatilem. *Br.*

365. C. lupulina: *Willd.* iv. p. 266. *Pursh.* i. p. 41. (W.)

8. *Spicis sexu distinctis, mascula solitaria, femineis superioribus sessilibus vel inclusè pedunculatis inferioribus pedunculatis.*

366. C. mutica: spica mascula squamis obtusis, femineis tribus distantibus subexserte pedunculatis erectis raris, stigmatibus binis, capsulis ovalibus muticis lævibus squama ovata mucronata longioribus, foliis bracteisque planis. *Brown, MS.* (W.)

367. C. oligocarpa: *Willd.* iv. p. 279. *Pursh.* i. p. 41. (W. B. C.)

9. *Spicis sexu distinctis, mascula solitaria, femineis omnibus pedunculatis.*

368. C. capillaris: *Willd.* iv. p. 290. (W.)

369. C. limosa: *Willd.* iv. p. 293. (W.)

370. C. podocarpa: spica mascula solitaria, femineis binis pendulis oblongis, stigmatibus tribus, fructibus ellipticis brevissimè rostellatis integris lævibus acheniisque pedicellatis, foliis caulinis inferioribus brevioribus lanceolatis. *Brown, MS.* (B.)

10. *Spicis sexu distinctis masculis pluribus.*

371. C. pellita: *Willd.* iv. p. 302. *Pursh.* i. p. 44. (W.)

372. C. ampullacea: *Willd.* iv. p. 308. (W.)

373. C. aristata: spicis femineis ternis quaternisve cylindraceis distantibus brevè pedunculatis, stigmatibus 3, capsulis glaberrimis nervosis rostro longissimo altebifido lævi: laciniis patentibus, squamis omnibus aristatis, foliis subtus vaginisque villosis. *Brown, MS.*

Inter C. bullatam et lacustrem. *Br.*

374. Alnus glutinosa: *Willd.* iv. p. 434. *Pursh.* ii. p. 622. (A. W. H.)

375. Urtica gracilis: *Willd.* iv. p. 356. (W.)

376. Myriophyllum spicatum: *Willd.* iv. p. 406. *Pursh.* i. p. 274. (W.)

377. Corylus americana? *Willd.* iv. p. 471? *Pursh.* ii. p. 634? (S.)
378. Betula papyracea: *Willd.* iv. p. 464. *Pursh.* ii. p. 621. (W.)
379. B. glandulosa: *Willd.* iv. p. 466. *Pursh.* ii. p. 622. (H. W. B. A.)
380. Calla palustris: *Willd.* ii. p. 290. *Pursh.* i. p. 399. (W.)
381. Pinus balsamea: *Willd.* iv. p. 504. *Pursh.* ii. p. 639. (W.)
382. P. nigra: *Lambert. Monogr.* p. 41. t. 27. *Pursh.* ii. p. 640. (W.)

It is found in swampy situations, as far north as lat. 65°, where it terminates together with the Betula papyracea.

383. P. alba: *Lambert. Monogr.* p. 39. t. 26. *Pursh.* ii. p. 641.

The *Meenahic* of the Crees is the most northerly tree that came under our observation. On the Copper-Mine River, within twenty miles of the Arctic Sea, it attains the height of twenty feet or more. Its timber is in common use throughout the country, and its slender roots, denominated *Watapeh*, are indispensable to canoe-makers for sewing the slips of birch-bark together. The resin which it exudes is used for paying over the seams of the canoes, and canoes for temporary purposes are frequently formed of its own bark. It is the only tree that the Esquimaux of the Arctic Sea have access to while growing, and they contrive to make pretty strong bows by joining pieces of its wood together.

384. P. Banksiana: *Lambert. Monogr.* p. 7. t. 3. *Pursh.* ii. p. 642.

This tree occupies dry sandy soils to the exclusion of all others. It is a handsome tree with long spreading flexible branches, generally furnished with whorled curved cones of many years' growth. It attains the height of forty feet and upwards in favourable situations, but the diameter of its trunk is greater in proportion to its height than in the other pines of the country. In its native situation it exudes much less resin than the pinus alba. The Canada porcupine feeds on its bark; and its wood, from its lightness and the straightness and toughness of its fibres is much prized for canoe timbers. The Canadian voyagers term it Cypres, the Crees Ooskartawuc-ahtic. It occurred on our route as far to the northward as lat. 64°, but it is said to attain higher latitudes on the sandy banks of Mackenzie's River.

385. P. microcarpa: *Lambert. Monogr.* p. 56. t. 37. *Pursh.* ii. p. 645.

Hab. In swampy situations, from York Factory to Point Lake, in lat. 65°. In the latter place it is very dwarfish, seldom exceeding six or eight feet in height. It is named by the voyagers L'Epinette Rouge, and by the Hudson's Bay men, Juniper. Its Cree name is Wagginawgan (the tree that bends.)

386. Thuya occidentalis: *Willd.* iv. p. 508. *Pursh.* ii. p. 646. (S.)

DICŒCIA.

387. Salix purpurea: *Smith. Fl. Brit.* iii. p. 1039. (W.)
388. S. rubra: *Smith. Fl. Brit.* iii. p. 1042. (W.)
389. S. decipiens: *Eng. Bot.* t. 1937. *Pursh.* ii. p. 617. (W.)
390. S. fragilis: *Smith. Fl. Brit.* iii. p. 1051. *Eng. Bot.* t. 1807. (W.)
391. S. cordata: *Pursh.* ii. p. 615. (W.)
392. S. myrsinites: *Wahl. Fl. Lapp.* p. 262. *Pursh.* ii. p. 617. (B.)
393. S. myrtilloides: *Wahl. Fl. Lapp.* p. 266. (W.)
394. S. Ammaniana: *Willd.* iv. p. 663? (W.)
395. S. reticulata: *Willd.* iv. p. 685. *Pursh.* ii. p. 610. (B.)
396. S. arctica: *Brown's List of Plants, Ross's Voyage.* (B.)

Diffusa. *Folia* elliptico-obovata integerrima pilis sericeis vestita mox glabra subtusque glauca venosa. *Antheræ* purpureæ: *Germina* sessilia elongata sensim acuminata griseo-tomentosa: *stylo* gracili. *Squamæ* germinibus 5-tuplo breviores obovatæ rotundatæve nigrescentes pilis sericeis vestitæ.

397. S. desertorum: foliis ovalibus integerrimis: subtus glaucis deciduo?-villosis venosis, germinibus sessilibus longitudine squamorum tomentosis, stigmatibus sessilibus bifidis. (B.)

Frutex erectus sesquipedalis, cortice flavescenti-bruno, nitido. *Folia* exstipulata exacte elliptica obtusa supra opaca glabra, subtus pube laxâ molli deciduâ? vestita. *Amenta* serotina: masculina diandra pollicaria cylindrica: fœminea pedicellata foliisque fulcrata; squamis fuscis ellipticis obtusis; germinibus sesquilineis ovatis acuminatis squamis vix altioribus, stigmatibus bifidis, segmentis filiformibus divaricatis; nectario interno filiformi.

398. S. vestita: *Pursh*. ii. p. 610. (H.W.)

399. S. glauca, α: *Wahl. Fl. Lapp*. p. 264. t. xvi. f. 3? (B.)

400. S. arenaria, macrostachys: *Schleicher*. S. limosa: *Wahl. Lapp*. p. 265? (B.)

401. S. candida: *Pursh*. ii. p. 608. (W.)

β? rugosa foliis nudiusculis exstipulatis reticulato-rugosis subtus glaucis, amentis omnino varietatis α. (W.)

402. S. rostrata: foliis ellipticis acutis integerrimis pubescentibus subtus glaucescentibus, germinibus longè pedicellatis ovato-subulatis tomentosis, stigmate sessili quadrifido. S. phylicifolia? *Smith. Comp. Fl. Br.* p. 146? *Eng. Bot.* t. 1958? *Folia* sesquipollicaria, exstipulata, pube sericea caduca? vestita, subtus grisea sub-glauca. *Amenta* fœminea sæpe ferè palmaria pedunculata foliis tribus quatuorve fulcrata. *Squamæ* elliptice pallide brunneæ pilosæ. *Pedicelli* primo squamas vix superantes mox ad longitudinem unguicularum elongati et squamis triplo quadruplove longiores. *Germina* e basi ovatâ in rostrum fere cylindricum producta, semper pedicellis longiora.

403. Empetrum nigrum: *Willd*. iv. p. 713. *Pursh*. i. p. 93. (W. B.)

In high northern latitudes its berries, after the first frosts, are very juicy and pleasant. They are hoarded up by the different species of marmots, and form the autumnal food of the Anas hyperborea.

404. Myrica gale: *Willd*. iv. p. 745. *Pursh*. ii. p. 618. (W.)

The Indian women use the buds of this plant to dye their porcupine quills with.

405. Populus trepida: *Willd*. iv. p. 803. *Pursh*. ii. p. 618. (W.)

Hab. From Hudson's Bay to the northward of Great Slave Lake, as far as lat. 64°. It is denominated by the Crees, metoos, and is esteemed to burn better in a green state than any other tree in the country.

406. P. balsamifera: *Willd*. iv. p. 805. *Pursh*. ii. p. 618.

The trunk of this tree attains a greater circumference than that of any other in the northern parts of America. It burns badly, and gives little heat when green, but its ashes yield a large quantity of potash. We traced it as far to the north as Great Slave Lake, and the south branch of Mackenzie's River has been named Rivière aux Liards, from its abundance in that quarter. It constituted the greatest part of the drift timber that we observed on the shores of the Arctic Sea. Its Cree name is Matheh-metoos, (ugly poplar.)

407. Juniperus communis: *Willd*. iv. p. 853. *Pursh*. ii. p. 647. (W.)

Its fruit is termed Caw-caw-quew-meena, (crow-berry), by the Crees.

408. J. prostata: *Pers. enchir*. ii. p. 632. (W.)

It is nearly as common as the other species, grows close to the ground, and sends out flagelliform branches two yards long.

409. Hippophäe canadensis: *Willd.* iv. p. 744. *Pursh.* i. p. 115. (H. W. B. A.)
410. Acer saccharinum: *Willd.* iv. p. 985? *Pursh.* i. p. 266? (S.)

CRYPTOGAMIA. FILICES.

411. Equisetum arvense: *Willd.* v. p. 1. *Pursh.* ii. p. 651. (W.)
412. E. sylvaticum: *Willd.* v. p. 3. *Pursh.* ii. p. 651. (W.)
413. E. umbrosum: *Willd.* v. p. 4? (C.)
Characteri specifico quadrat. Vaginæ glaucæ dentibus circiter 14 nigro-fuscis, marginibus hyalinis.
414. E. palustre: *Willd.* v. p. 5. *Pursh.* ii. p. 651. (B.)
415. E. variegatum: *Smith. Comp. Fl. Brit.* p. 154. *Eng. Bot.* t. 1987. (B.)
416. E. scirpoides: *Willd.* v. p. 7. *Pursh.* ii. p. 652. (W.)
417. Lycopodium complanatum: *Willd.* v. p. 19. *Pursh.* ii. p. 652. (W. B.)
418. L. selago: *Willd.* v. p. 49. *Eng. Bot.* t. 233. (W. B.)
419. L. dendroideum: *Willd.* v. p. 21. *Pursh.* ii. p. 653. (W.)
420. L. annotinum: *Willd.* v. p. 23. *Pursh.* ii. p. 653. (W. B.)
421. L. alpinum: *Willd.* v. p. 20 *Eng. Bot.* t. 234. (B.)
422. Polypodium vulgare: *Willd.* v. p. 172. *Pursh.* ii. p. 658. (W.)
423. P. dryopteris: *Willd.* v. p. 209 *Eng. Bot.* t. 616. (W.)
424. Woodsia ilvensis: *Pursh.* ii. p. 660. Nephrodium rufidulum: *Mich. Am.* ii. p. 269. fide exempl. à D. Reichard.
425. W. glabella: frondibus (lanceolato-linearibus) pinnatis glaberrimis, pinnis triangularibus pinnatifidis: imis dilatatis; laciniis cuneiformibus, rachi nuda, stipite squamato. *Brown. MS.* (W.)
426. Athyrium fragile: Aspidium fragile: *Willd.* v. p. 280. (W.)
427. Nephrodium fragrans: Aspidium fragrans: *Willd.* v. p. 253. (C. W. B.)
428. Pteris gracilis? *Willd.* v. p. 376?? *Pursh.* ii. p. 668?? (W.)
Var? nana, fronde unguiculari, pinnis omnibus indivisis.
429. Cryptogramma acrostichoides: frondibus bipinnatifidis, sterilium pinnulis ovalibus crenatis; fertilium demum explanatis, soris linearibus discum totum occupantibus. *Brown, ad finem Catalogi.* (W.)

MUSCI.

430. Sphagnum squarrosum: *Schwægr. Muscor. Frond. Suppl.* i. par. i. p. 49. *Hook & Taylor, Muscol. Brit.* p. 4. (W.B.)
431. S. acutifolium: *Schwægr. Sup.* I. i. p. 15. *Musc. Brit.* p. 4. (W.B.)
β rufescens. (W.B.)
γ tenera. (W.B.)
432. Anœctangium ciliatum: *Schwægr. Sup.* I. i. p. 38. *Musc. Brit.* p. 14. (W.B.)
433. Tetraphis pellucida: *Schwægr. Sup.* I. i. p. 39. *Mich. Fl. Am.* p. 287. *Musc. Brit.* p. 16. (W.)
434. Andræa alpina: *Schwægr. Sup.* I. i. p. 42. *Mus. Brit.* p. 1. (B.)

435. Splachnum mnioides: *Schwægr. Sup.* I. i. p. 48. (B.)

Hab. Very common on the Barren Grounds, forming tufts, whose roots always include the bones of some small animal.

436. S. angustatum: *Schwægr. Sup.* I. i. p. 48. *Mus. Brit.* p. 20. (W.)

437. S. Brewerianum: *Schwægr. Sup.* I. i. p. 49. S. mnioides. *Eng. Bot.* t. 786.(B.)

β. minus. (B.)

438. S. urceolatum: *Schwægr. Sup.* I. i. p. 49. (B.)

439. S. vasculosum, var., minima: *Schwægr. Sup.* I. i. p. 51. *Mus. Brit.* p. 21. (B.)

440. S. luteum: *Schwægr. Sup.* I. i. p. 55. *Wahl. Flor. Lap.* p. 308. (B.)

441. Encalypta pilifera: *Schwægr. Sup.* II. t. 26. *Funx. in Sturmii Flor. Germ. Crypt.* 15. (W.B.)

442. Weissia cirrata; *Schwægr. Sup.* I. i. p. 75. *Mus. Brit.* p. 46. (W.)

443. Grimmia ovata: *Schwægr. Sup.* I. p. 85. t. 24. *Mus. Brit.* p. 39. (B.)

444. G. sudetica: *Schwægr. Sup.* I. i. p. 87. (B.)

445. G. apocarpa: *Schwægr. Sup.* I. i. p. 95. (W.B.)

446. Barbula unguiculata: *Schwægr. Sup.* I. i. p. 123. Tortula unguiculata: *Musc. Brit.* p. 33. (W.)

447. Tortula ruralis: *Schwægr. Sup.* I. i. 137. *Musc. Brit.* p. 31. (W.B.)

448. Trichostomum lanuginosum: *Schwægr. Sup.* I. i. p. 149. *Musc. Brit.* p. 60. (W.B.)

449. Dicranum scoparium: *Schwægr. Sup.* I. i. p. 162. t. 42. *Mich. Fl. Amer.* p. 297. (W.)

450. D. polysetum: *Schwægr. Sup.* I. i. 165. *Mich. Fl. Am.* p. 297. D. undulatum: *Musc. Brit.* p. 57. (W.)

451. D. Schraderi: var. major: *Schwægr. Sup.* I. i p. 166. (B.)

452. D. fuscescens: *Turner, Musc. Hiber.* p. 60. t. 5. fig. 1. (B.)

453. D.elongatum: *Schwægr. Sup.* I. i. p. 171.

Hab. On the Barren Grounds. This, and the other species of Dicrana, form dense tufts on the Barren Grounds, that are very troublesome to pedestrians, and obtain from the Indians the name of women's heads, because, say they, when you kick them they do not get out of the way.

454. D. polycarpum: *Schwægr. Sup.* I. i. p. 179. *Musc. Brit.* p. 57. (B.)

455. D. purpureum: *Schwægr. Sup.* I. i. p. 183. *Mich. Fl. Am.* p. 298. (W.B.)

456. D. strictum: *Schwægr. Sup.* I. i. p. 188. (B.)

457. D. virens: *Schwægr. Sup.* I. i. p. 194. *Musc. Brit.* p. 34. (B.)

458. D. strumiferum: *Schwægr. Sup.* I. i. p. 194. *Musc. Brit.* p. 34. (B.)

β. prælongum. (B.)

459. Fissidens taxifolus: *Schwægr. Sup.* I. ii. p. 10. *Musc. Brit.* p. 54. (B.W.)

460. Didymodon capillaceum: *Musc. Brit.* p. 67. (B.)

461. Orthotrichum obtusifolium: *Schwægr. Sup.* I. ii. p. 14. t. L. (B.)

462. O. rupestre: *Schwægr. Sup.* I. ii. p. 27. t. liii. (B.)

463. O. cupulatum: *Schwægr. Sup.* I. ii. p. 35. t. L. *Musc. Brit.* p. 72. (W.B.)

464. O. anomalum: *Schwægr. Sup.* I. ii. p. 37. *Musc. Brit.* p. 72. (B.W.)
465. O. Hutchinsiæ: *Musc. Brit.* p. 73. t. xxi. (W.)
466. O. speciosum: *Flor. German. Sturmii.* (W.)
467. O. elegans: *Schwægr. ined.* (W.)
468. Bartramia ithyphylla: *Schwægr. Sup.* I. ii. p. 51. *Musc. Brit.* p. 86. (B.)
469. Webera pyriformis: *Schwægr. Sup.* I. ii. 66. *Mich. Fl. Am.* p. 302. (W.)
470. W. nutans: *Schwægr. Sup.* I. ii. p. 67. Bryum nutans: *Musc. Brit.* p. 123. (B.)
471. W. alpina: *Schwægr.* (B.)
472. Funaria hygrometrica: *Schwægr. Sup.* I. ii. p. 75. *Musc. Brit.* p. 69. (W.)
473. Meesia uliginosa: *Schwægr.* I. ii. p. 82. Bryum trichodes: *Musc. Brit.* p. 116. (B.)
474. Timmia megapolitana: *Schwægr. Sup.* I. p. 84. T. cucullata: *Mich. Fl. Am.* p. 304. (B.)
475. Bryum carneum, β: *Schwægr, Sup.* I. p. 91. (B.)
476. B. pulchellum, atro-purpureum: *Wahl. Fl. Lapp.* p. 360. (B.)
477. B. cæspiticium: *Schwægr. Sup.* I. ii. p. 109. *Musc. Brit.* p. 121. (W.B.)
478. B. ventricosum: *Musc. Brit.* p. 124. (W.B.)
479. B. pallens: *Schwægr. Sup.* I. ii. p. 111. (W.)
480. Mnium palustre: *Schwægr. Sup.* I. ii. p. 122. *Mich. Fl. Am.* p. 305. (W.)
481. Mn. turgidum: *Schwægr. Sup.* I. ii. p. 123. *Wahl. Fl. Lap.* p. 351. (W.)
482. Mn. crudum: *Schwægr. Sup.* I. ii. p. 127. Bryum crudum: *Musc. Brit.* p. 119. (W.)
483. Mn. cuspidatum: *Schwægr. Sup.* I. ii. p. 132. Bryum cuspidatum: *Musc. Brit.* p. 127. (W.)
484. Mn. rostratum: *Schwægr Sup.* I. ii. p. 136. Bryum rostratum: *Musc. Brit.* p. 126. (W.)
485. Climacium dendroides: *Schwægr. Sup.* I. ii. p. 141. Leskea dendroides: *Mich. Fl. Am.* p. 309. (W.)
486. Neckera pennata: *Schwægr. Sup.* I. ii. p. 144. *Mich. Fl. Am.* p. 307. (W.)
487. Leskea polyantha: *Schwægr. Sup.* I. ii. p. 173. (W.)
488. Hypnum denticulatum: *Schwægr. Sup.* I. ii. p. 187. Var. α *Musc. Brit.* p. 92. (W.B.)
489. H. stramineum: *Schwægr. Sup.* I. ii. p. 213. *Musc. Brit.* p. 97. (W.)
490. H. Schreberi: *Schwægr. Sup.* I. ii. p. 227. *Musc. Brit.* p. 96. (W.)
491. H. nitens: *Schwægr. Sup.* I. ii. p. 228. *Musc. Brit.* p. 100. (W.)
492. H. abietinum: *Schwægr. Sup.* I. ii. p. 232. *Mich. Fl. Am.* p. 316. (B.)
493. H. splendens: *Schwægr. Sup.* I. ii. p. 237. *Mich. Fl. Am.* p. 317. (W.B.)
494. H. lutescens: *Schwægr. Sup.* I. ii. p. 237. *Musc. Brit.* p. 100. (W.)
495. H. striatum: *Schwægr. Sup.* I. ii. p. 238. *Musc. Brit.* p. 106. (W.)
496. H. plumosum: *Schwægr. Sup.* I. ii. p. 244. (W.)
497. H. serpens: *Schwægr. Sup.* I. ii. p. 260. *Musc. Brit.* p. 94. (W.)

498. H. crista castrensis: *Schwægr. Sup.* 1. ii. p. 293. *Mich. Fl. Am.* p. 314. (W.)
499. H. scorpioides: *Schwægr. Sup.* I. ii. p. 293. *Musc. Brit.* p. 112. (W.)
500. H. rugosum: *Schwægr. Sup.* I. ii. p. 301. H. rugulosum; *Musc. Brit.* p. 212. (W.)
501. H. uncinatum: *Schwægr. Sup.* I. ii. p. 304. *Musc. Brit.* p. 111. (W.)
502. H. fluitans: *Schwægr. Sup.* I. ii. p. 304. *Musc. Brit.* p. 98. (W.)

HEPATICÆ.

503. Jungermannia tamariscifolia: *Schwægr. Prodrom.* p. 14. *Hook Jung.* t. vi. (B.)
504. J. bidentata: *Schwægr. Prodr.* p. 18. *Hook. Jung.* t. xxv. (B.)
505. J. pulcherrima: *Schwægr. Prodr.* p. 21. J. ciliaris: *Hook. Jung.* t. lxv. (W.)
506. J. setiformis: *Schwægr. Prodr.* p. 21. *Hook. Jung.* t. xx. (B.)
507. J. complanata: *Schwægr. Prodr.* p. 22. *Hook. Jung.* t. lxxxi. (W.)
508. J. nemorosa: *Schwægr. Prodr.* p. 23. *Hook. Jung.* t. xxi. (W.)
509. J. sphagni: *Schwægr. Prodr.* p. 24. *Hook. Jung.* t. xxxiii. *et Sup.* t. ii. (B.)
510. J. emarginata: *Schwægr. Prodr.* p. 27. *Hook. Jung.* t. xxvii. (B.)
511. J. saxicola: *Schrader. Schwægr. Prodr.* p. 27. (B.)
512. J. bicornis: *Schwægr. Prodr.* p. 27.
513. J. bicuspidata: *Schwægr. Prodr.* p. 28. *Hook. Jung.* t. xi. (B.)
514. J. exsecta: *Schwægr. Prodr.* p. 29. *Hook. Jung.* t. xix. (B.)
515. J. quinquedentata: *Schwægr. Prodr.* p. 29. J. barbata: *Hook. Jung.* t. lxx. (B.)
516. Marchantia polymorpha: *Schwægr. Prodr.* p. 23. *Mich. Fl. Am.* p. 227. (W. B.)
517. M. conica: *Schwægr. Prodr.* p. 34. *Eng. Bot.* t. 504. (W.)
518. Riccia natans; *Schwægr. Prodr.* p. 38. *Eng. Bot.* t. . (W.)

LICHENES.

519. Arthonia astroidea, β radiata: *Ach. Syn.* p. 6. (W.)
520. Spiloma versicolor: *Ach. Syn.* p. 2. *Eng. Bot.* t. 2076. (W.)
521. Solorina crocea: *Ach. Syn.* p. 8. Lichen croceus: *Eng. Bot.* t. 498. (B.)
522. Gyalecta bryophila: *Ach. Syn.* p. 10 & 337. *Flor. Dan.* t. 1351. f. 2. (B.)
523. Lecidea atro-alba: *Ach. Syn.* p. 11 ? (B. W.)
524. L. fumosa: *Ach. Syn.* p. 12. Lichen arthrocarpus: *Eng. Bot.* t. 1829. (W.)
525. L. lapicida: *Ach. Syn.* p. 13. *Muhl. Cat.* p. 105. (W.)
526. L. confluens: *Ach. Syn.* p. 16. *Eng. Bot.* t. 1964. (W. B.)
527. L. parasema: *Ach. Syn.* p. 17. *Eng. Bot.* t. 1450. *Muhl. Catalog.* p. 105. (W.)
528. L. sabuletorum: *Ach. Syn.* p. 20. (W.)

529. L. atro-virens : *Ach. Syn.* p. 21. (W. B.)
β geographica : *Ach. Syn.* p. 21. Lichen geographicus : *Eng. Bot.* t. 248. (B.)
530. L. Oederi : *Ach. Syn.* p. 22. Lichen Oederi : *Eng. Bot.* t. 117. (B.)
531. L. uliginosa : *Ach. Syn.* p. 25 ? *Eng. Bot.* t. 1466 ? (B.)
532. L. rivulosa : *Ach. Syn.* p. 28. *Eng. Bot.* t. 1737. (B.)
533. L. abietina : *Ach. Syn.* p. 30. (W.)
534. L. vernalis : *Ach. Syn.* p. 36. (W.)
535. L. decolorans β, granulosa : *Ach. Syn.* p. 38. *Eng. Bot.* t. 1185. (W.)
536. L. luteola : *Ach. Syn.* p. 41. Lichen vernalis : *Eng. Bot.* t. 845. (W.)
537. L. fusco-lutea : Lichen fusco-luteus : *Eng. Bot.* t. 1007. Lecidea fusco-lutea : *Ach. Syn.* p. 42 ? (B.)
538. L. anthracina : *Ach. Syn.* p. 43 ? (W.)
539. L. icmadophila : *Ach. Syn.* p. 45. *Muhl. Cat.* p. 105. (B. W.)
540. L. Ehrhartiana, β polytropa : *Ach. Syn.* p. 47. Lichen polytropus : *Eng. Bot.* t. 1264. (B.)
541. L. lucida : *Ach. Syn.* p. 48. Lichen lucidus ; *Eng. Bot.* t. 1550. (B.)
β theyotea : *Ach. Syn.* p. 48. On dead wood. (B.)
542. L. luteo-alba : *Ach. Syn.* p. 49. Lichen luteo-albus : *Eng. Bot.* t. 1426. (W.)
543. L. Wahlenbergii : *Ach. Syn.* p. 50. *Method. Lich.* t. 2. f. 2. (B.)
544. L. candida : *Ach. Syn.* p. 50. Lichen candidus : *Eng. Bot.* t. 1138. (B.)
545. L. vesicularis : *Ach. Syn.* p. 51. Lichen cœruleo-nigricans : *Eng. Bot.* t. 1139. (B.)
546. L. decipiens : *Ach. Syn.* p. 52. Lichen decipiens : *Eng. Bot.* t. 1501. (B.)
547. Calicium tigillare : *Ach. Syn.* p. 55. Lecidea tigillaris : *Wahl. Fl. Lapp.* p. 468. *Eng. Bot.* t. 1330. (W. B.)
548. C. chlorellum, β trabinellum : *Ach. Syn.* p. 60. Lichen trabinellus : *Eng. Bot.* t. 1540. (W. B.)
549. C. debile : *Eng. Bot.* t. 2462. (W.)
550. C. claviculare : *Ach. Syn.* p. 57. (W.)
551. Gyrophora proboscidea, β arctica : *Ach. Syn.* p. 65. Tab. xxx. fig. 4.

Thallus monophyllus, umbilicatus, orbicularis, tenuis, in ambitu plerumque lacerus ; supra rugis umbilicum versus majoribus reticulatus, concavus vel convexus et nisi ex rupto margine planus, semper medio umbonem vel umbilicum ostendens ; subtus pedicello brevissimo centrali saxo affixus, glaber, ambitum versus levissimè lacunosus, quandoque punctis depressis notatus et rarissimè fibrillis quibusdam instructus. Thalli color brunnescenti-niger et aliquando quasi pulvisculo suffuso fere cinereus : subtus sordidè flavescenti-brunneus interdum cineraseens : utrinque opacus. In aquâ totus pallet. *Apothecia* sessilia, orbicularia, rarius angulata, disco plano vel convexiusculo, plicis concentricis pulcherrimè notato et margine proprio elevato cincto.

Expl. Iconis. *a.* Superf. supina. *b.* Superf. prona. mag. nat. *c.* Apothecium et portio thalli sub lente visi.

Hab. On rocks on the Barren Grounds ; more abundant towards the Arctic Sea than the following species.

552. G. hyperborea : *Ach. Nov. Act. Stockh.* xv. t. 2. f. 2. *Ach. Syn.* p. 66. Tab. xxx. fig. 3.

Thallus lacero-laciniatus, supra densissimè purpureo-rugosus, subtus magis aut minus reticulato-lacunosus, glaber. *Apothecia* difformia, angulata, convexa, plicis utplurimum circinatis notata. Præcedenti affinis et fortassè varietas senilis. (B.)

Expl. Iconis eadem ut in præcedenti.

553. G. pensylvanica: *Ach. Syn.* p. 67. *Muhl. Cat.* p 105. Tab. 30. Fig. 2.

Thallus tenuis umbilicatus, irregulariter expansus flexuosus, passim erosus, in ambitu lacero-laciniatus, supra umbrino-brunneus, plerumque prope umbilicum materiâ quâdam crustaceâ canescens, papulis elevatis, oblongis vel conoideis, obtusis, sparsis, discretis, saccis paginæ adversæ respondentibus munitus; subtus lacunosus, punctis crebris elevatis scaber; brunnescenti-niger ambitum versus pallidior; utrinque opacus. Madefactus aliquantulum pallet et supra olivaceus vel æneo-fuscus evadit.

Apothecia simplicia adpressa, orbiculata vel flexuosa angulataque, disco opaco, plano vel concaviusculo, æquabili interdum ostiolo centrali impresso et margine proprio elevato nitidiusculo cincto. Apothecia aliquando in discis suis alia minora ferunt vel cum aliis confluunt quibus modis formatur apothecium satis magnum disco planiusculo irregulariter plicato margine communi flexuoso, et angulato cincto. Sunt quoque in thallis quibusdam fortassin vetustioribus apothecia dissimilia parva, discreta, aut conferta, discis depressis et marginibus granulato-crenulatis, rugosis, inflexisque. Apothecia vetustiora utriusque generis in ambitu à thallo elevata sunt.

Thallus interdum locos humidos opacos habitans flavescenti-cinereus fit. (B.)

Expl. Icon: *a*. superficies thalli supina, *b*. superf. prona mag. nat. *c*. apothecium et portio thalli exsecti sub lente visi.

554. G. Muhlenbergii: *Ach. Syn.* p. 67. *Muhl. Cat.* p. 105.

Thallus hujus quam trium præcedentium paulo crassius, plerumque polyphyllus, hepatico-brunneus, extrorsum fere nigricans, oblique umbilicatus, flexuosus, prope umbilicum capillaceo-brunneus corrugato-plicatus, plerumque irregulariter expansus, margineque lacero, hic illic pertusus erosusque; supra glaber, nitidiusculus, foveolis ab apotheceis impletis ambitum versus præcipue impressis; subtus sordidè flavescenti-brunneus, minute verrucosus, at fixuris cribriformibus nigrescentibus fere obtectus. *Apothecia* majuscula vix unquam orbiculata, fere semper angulata, et non raro pulchrè stellata, convexa, densissimè plicata non semper in sacculis immersa sed etiam in planâ superficie thalli sessilia. Dantur quoque in eodem thallo apothecia alia parva fere orbicularia, disco depresso et margine granulato rugosoque inflexo.

Expl. Icon. *a* superficies thalli supina, *b* superficies partis thalli prona mag. nat. *c*. pars thalli cum apothecio exsecta, et sub lente visa.

Hab. This and the three preceding species were found in greater or less abundance in all rocky places throughout our journey. We used them all four as articles of food, but not having the means of extracting the bitter principle from them, they proved noxious to several of the party producing severe bowel complaints. The Indians use the G. Muhlenbergii, rejecting the others, and when boiled along with fish-roe or other animal matter, it is agreeable and nutritious. On the Barren Grounds this lichen is scarce, and we were obliged to resort to the other three, which served the purpose of allaying the appetite, but were very inefficient in recruiting our strength.

555. G. vellea, *Ach. Syn.* p. 68. Umbilicaria vellea. *Mich. Fl. Am.* ii. p. 323.

Thallus crassiusculus, molliusculus, sæpe latitudine sesquipedalis, sordide flavescenti-griseus (sub lente verrucosus) pertusus erosusque, in ambitu sub rotundato-lobatus, lacerusque; subtus fibrillis densis brevibus, furcatis, nigris, hirsutus. *Apothecia* nunquam inveni.

Hab. on shady and moist rocks, most luxuriant in woods. This is more agreeable to eat than any of the preceding species, but we met with it very sparingly on the Barren Grounds.

556. Opegrapha macularis: *Ach. Syn.* p. 72. *Muhl. Cat.* p. 105. (W.)

557. O. epipasta, β. microscopica: *Ach. Syn.* p. 75. O. microscopica. *Eng. Bot.* t. 1911. (W.)

558. Verrucaria epidermidis: *Ach. Syn.* p. 89. (W.)

559. V. stigmatella: *Ach. Syn.* p. 89. *Eng. Bot.* t. 1891. *Muhl. Cat.* p. 105. (W.)

560. Endocarpon complicatum: *Ach. Syn.* p. 102. *Eng. Bot.* t. 593. (B.)

561. E. viride (absque scutellis); *Ach. Lich. Univers.* p. 300. (B.)

562. Thelotrema lepadinum: *Ach. Syn.* p. 115. Lichen inclusus. *Eng. Bot.* t. 678 (B.)

563. Variolaria communis, *g.* aspergilla: *Ach. Syn.* p. 131. *Eng. Bot.* t. 2041. *Muhl. Cat.* p. 105. (B.)

564. Urceolaria cinerea: *Ach. Syn.* p. 140. *Hoff. Pl. Lich.* t. 20. f. 2. (B.)

565. Lecanora atra: *Ach. Syn.* p. 146. Lichen ater. *Eng. Bot.* t. 949. *Muhl. Cat.* p. 105. (B.)

566. L. oculata: *Ach. Syn.* p. 148. Lichen oculatus. *Eng. Bot.* t. 1833. (B.)

567. L. periclea: *Ach. Syn.* p. 150. (W. B.)

568. L. badia; *Ach. Syn.* p. 154. Lichen piceus. *Dicks. Crypt. Fasc.* 4: t. 12. f. 1. (B.)

569. L. epibryon: *Ach. Syn.* p. 155. (B.)

570. L. sub-fusca: *Ach. Syn.* p. 157. *Eng. Bot.* t. 2109. *Muhl. Cat.* (W. B.)

571. L. ventosa: *Ach. Syn.* p. 159. *Eng. Bot.* t. 906. (B.)

572. L. glaucoma: *Ach. Syn.* p. 165. *Eng. Bot.* t. 2156. (B.)

573. L. parella, γ upsaliensis: *Ach. Syn.* p. 169. Lichen upsaliensis. *Eng. Bot.* t. 1634. (B.)

574. L. tartarea: *Ach. Syn.* p. 172? Lichen tartareus. *Eng. Bot.* t. 156? (B.)

575. L. cerina: *Ach. Syn.* p. 173. Lichen cerinus: *Eng. Bot.* t. 627. *Muhl. Cat.* p. 105.

576. L. erythrella: *Ach. Syn.* p. 175.

577. L. citrina: *Ach. Syn.* p. 176. *Eng. Bot.* t. 1793. (W.)

578. L. straminea: *Ach. Syn.* p. 180. *Wahl. Fl. Lapp.* t. 28. f. 1. (B.)

579. L. miniata: *Ach. Syn.* p. 182. *Muhl. Cat.* p. 105. (B. W.)

580. L. elegans: *Ach. Syn.* p. 182. Lichen elegans. *Eng. Bot.* t. 2181. (B.)

581. L. cervina: *Ach. Syn.* p. 188. Lichen squamulosus. *Eng. Bot.* t. 2011. (bad.) (B.)

582. L. liparia: *Ach. Syn.* p. 190. (B.)

β. rubina: *Ach. Syn.* p. 190. (B.)

583. L. virella: *Ach. Syn.* p. 191. *Eng. Bot.* t. 1696. (B.)

584. L. candelaria: *Ach. Syn.* p. 192. Lichen candelarius. *Eng. Bot.* t. 1794. (W.)

β. polycarpa: *Ach. Syn.* p. 192. Lichen polycarpus. *Eng. Bot.* t. 1795. (B.)

585. L. hypnorum: *Ach. Syn.* p. 193. Lichen hypnorum. *Eng. Bot.* t. 740. (B.)

586. L. brunnea: *Ach. Syn.* p. 193. Lichen brunneus. *Eng. Bot.* t. 1246. (B.)

587. Parmelia caperata, b. cylisphora: *Ach. Syn.* p. 196. *Muhl. Cat.* (W.)
588. P. herbacea: *Ach. Syn.* p. 198. Lichen lætè virens: *Eng. Bot.* t. 294. (W.)
589. P. olivacea: *Ach. Syn.* p. 200. L. olivaceus. *Eng. Bot.* t. 2180. *Muhl. Cat.* (W. B.)
590. P. saxatilis: *Ach. Syn.* p. 203. *Eng. Bot.* t. 603. *Muhl. Cat.* p. 105. (W. B.)
591. P. fahlunensis: *Ach. Syn.* p. 204. *Eng. Bot.* t. 653. (B.)
592. P. stygia: *Ach. Syn.* p. 205. Lichen stygius. *Eng. Bot.* t. 2048. (B.)
593. P. ambigua: *Ach. Syn.* p. 208. (B.)
594. P. conspersa: *Ach. Syn.* p. 209. *Muhl. Cat.* *Eng. Bot.* t. 2097. (W. B.)
595. P. muscigena, β. lenta: *Ach. Syn.* p. 213. (B.)
596. P. pulverulenta: *Ach. Syn.* p. 214. *Eng. Bot.* t. 2063. *Muhl. Cat.* (W.)
597. P. aipolia: *Ach. Syn.* p. 215. *Muhl. Cat.* (W.)
598. P. stellaris; *Ach. Syn.* p. 216. *Muhl. Cat.* (W.)
599. P. cycloselis: *Ach. Syn.* p. 216. (W. B.)
600. P. physodes: *Ach. Syn.* p. 218. *Muhl. Cat.* (W. B.)
γ. platyphylla: *Ach. Syn.* p. 218. absque scutellis. (B.)
601. Borrera ciliaris: *Ach. Syn.* p. 221. *Muhl. Cat.* (W. B.)
602. B. tenella: *Ach. Syn.* p. 221. (W.)
603. Cetraria juniperina: *Ach. Syn.* p. 226. *Muhl. Cat.* p. 106. (B.)
β. Pinastri: *Ach. Syn.* p. 226. (B. W.)
604. C. sepincola: *Ach. Syn.* p. 226. (W. B.)
605. C. nivalis: *Ach. Syn.* p. 228. (B.)
606. C. cucullata: *Ach. Syn.* p. 228. (B.)
607. C. islandica: *Ach. Syn.* p. 229. *Muhl. Cat.* p. 106. (B.)
608. C. Richardsonii: (*Hooker, MS.*) thallo brunneo omnino libero: laciniis dichotomis linearibus, apotheciis marginalibus flavescenti-brunneis. (B.)

Thallus coriaceus prostratus, angustifolius, divaricato-bi-pinnatifidus aut dichotomè sinuato-bipartitus, supra convexus, rubescenti-brunneus nitidus, subtus canaliculatus opacus pallidior fere canescens, sed maculis magnis irregularibus ejusdem substantiæ colorisque ac pagina superior interspersus. *Laciniæ* omnes præter ultimas ejusdem latitudinis sunt et stellatim extrorsum expansæ: ultimæ augustiores plerumqne divaricato-furcatæ sunt aut tantum emarginatæ. Margines thalli integerrimi aut sparsiter granuluto-dentati etiam in sicco revoluti, in humido ità connivent ut lacinias tubulosas reddunt; Exsiccatione iterum evolountur. *Apothecia* in margine thalli sparsa, in initio concava margine inflexo mox ampla sub-pedicellata flexuosa margineque irregulariter reflexo; supra laminà proligerâ flavescenti-brunnea, nitida, margine thallode eam non excedente sub-cincta subtus e pagina thalli superiora formata. Ambitus apotheciorum granulatus repandus aut etiam fissus semper valde irregularis et modo Cetrariarum sub-liberus. Thallus in sicco fragilis vix tamen rigidus, madefactus pallet totus et ejus apices interdum olivaceo-virides fiunt. Sunt quoque specimina quorum apices colorem viridem etiam in sicco conservent. In nuda terra latè pulvinatim expansus est sed nulla radice humo affixus. Rarius fructificat.

Hab. On the Barren Grounds generally in Rein-deer tracks. It was not found to the southward of Great Slave Lake.

609. Peltidea scutata: *Ach. Syn.* p. 237. *Eng. Bot.* t. 1834. *Muhl. Cat.* (W.)
610. P. aphthosa: *Ach. Syn.* p. 238. *Muhl. Cat.* (W. B.)

611. Nephroma polaris: *Ach. Syn.* p. 241. (W. B.)

612. N. resupinata: *Ach. Syn.* p. 241. (W.)

613. Evernia prunastri: *Ach. Syn.* p. 245. *Eng. Bot.* t. 859. *Muhl. Cat.* (W.)

614. Dufourea arctica: thallo sulphureo-flavo nitido fistuloso, apotheciis hepatico-brunneis: D. rugosa. *Brown, Ross's Voyage* ? (B.)

Ex thallo vetusto fistuloso prostrato surculi subulato-ventricosi exsurgunt; sæpe cæspitosim, sese inter muscos erigentes: thallo primordiali destructo hi surculi thallos erectos fere palmares sulphureo-flavos, ad basin flavescenti brunneos sæpissime simpliciusculos efficiunt, nunc tamen ramum unum val alterum edunt aut furcati extant, interdum nec non apicibus casu excisis, ramuli excrescunt podetias Cenomyceum quarundam simulantes. Thallus membranaceus extus nitidiusculus, obsolete lacunosus sæpe punctis obscure brunnescenti rubris maculatus, intus læviusculus niveo-albus opacus, absque septis; nunc integerrimus, nunc uno vel altero foramine perforatus. *Apothecium* ex lamina proligera plana, nitida castaneo-vel hepatico brunnea in apicem rami posita, margineque obsoletiori sub-crenulato ex thallo corrugato facto, formatum. Humiditate lamina proligera melleo-flava fit.

615. Cenomyce cervicornis: *Ach. Syn.* p. 251. *Eng. Bot.* t. 2574. (B.)

616. C. pyxidata: *Ach. Syn.* p. 252. *Muhl. Cat.* (W. B.)

617. C. fimbriata: *Ach. Syn.* p. 254. *Eng. Bot.* t. 2438. (B. W.)

f. prolifera: *Ach. Syn.* p. 256. (W. B.)

618. C. gonorega, h. polypæa: *Ach. Syn.* p. 260. *Muhl. Cat.* (W. B.)

619. C. ecmocyna, a. gracilis: *Ach. Syn.* p. 261. (B.)

620. C. oxyceras. *Ach. Syn.* p. 264. (B.)

β. cladonioides: *Ach. Syn.* p. 264. (B.)

621. C. deformis: *Ach. Syn.* p. 268. *Eng. Bot.* t. 1934. *Muhl. Cat.* (W. B.)

622. C. coccifera: *Ach. Syn.* p. 269. *Eng. Bot.* t. 2051. *Muhl. Cat.* (W. B.)

623. C. parecha: *Ach. Syn.* p. 272. *Fl. Dan.* t. 1356. *f.* 2. *Muhl. Cat.* (W.B.)

624. C. rangiferina: *Ach. Syn.* p. 277. *Muhl. Cat.* p. 106. (W. B.)

δ. pungens: *Ach. Syn.* p. 278. Lichen pungens: *Eng. Bot.* t. 2444. (W.B.)

625. C.? vermicularis: *Ach. Syn.* p. 278. (B.)

626. Stereocaulon paschale: *Ach. Syn.* p. 284. *Muhl. Cat.* (W. B.)

627. Sphærophoron compressum: *Ach. Syn.* p. 287. (B.)

628. Alectoria jubata: *Ach. Syn.* p. 591. *Eng. Bot.* t. 1880. *Muhl. Cat.* (W.)

δ. chalybeiformis: *Ach. Syn.* p. 593. (B.)

629. Ramalina fastigiata: *Ach. Syn.* p. 296. *Eng. Bot.* t. 1890. *Muhl. Cat.* (W. B.)

630. R. farinacea: *Ach. Syn.* p. 297. *Eng. Bot.* t. 889. (W. B.)

631. Cornicularia tristis: *Ach. Syn.* p. 299. (B.)

632. C. divergens: *Ach. Syn.* p. 300? Lichen divergens: *Wahl. Fl. Lapp.* p. 439? (B.)

633. C. ochroleuca: *Ach. Syn.* p. 301. Cum scutellis. (B.)

634. C. pubescens: *Ach. Syn.* p. 302. *Eng. Bot.* t. 2318. (B.)

635. Usnea florida: *Ach. Syn.* p. 304. *Muhl. Cat.* (W.)

636. U. plicata: *Ach. Syn.* p. 305. *Eng. Bot.* t. 257. *Muhl. Cat.* p. 106. (W.)

γ. hirta: *Ach. Syn.* p. 305. *Eng. Bot.* t. 1354. *Muhl. Cat.* (B.)

637. Collema nigrum: *Ach. Syn.* p. 308. Lichen niger, *Eng. Bot.* t. 1980. (B.)
638. C. saturninum: *Ach. Syn.* p. 320. *Eng. Bot.* t. 1980. (B.)
639. Lepraria chlorina: *Ach. Syn.* p. 329. *Eng. Bot.* t. 2038. *Muhl. Cat.* (W. B.)

FUNGI.

640. Sphæria concentrica: *Pers. Syn. Fung.* p. 8. *Muhl. Cat.* (W.)
641. S. disciformis: *Pers.* p. 24. *Muhl. Cat.* S. depressa: *Sowerby.* Nemaria disciformis. *Gray. Nat. Arr. Brit. Pl.* (W.)
642. Hysterium pinastri: *Pers. Addend.* p. xxviii. (W.)
643. Lycoperdon pratense: *Pers.* p. 142. *Muhl. Cat.* (W.)
644. L. perlatum, var: *Pers.* p. 145. (W.)
645. Schizophyllum commune: *Fries. Syst. Myc.* i. p. 330. Agaricus alneus: *Pers.* p. 485. *Muhl. Cat.* (W.)
646. Dædalea serpens: *Fries.* i. p. 340. (W.)
647. Polyporus varius: *Fries.* p. 352. Boletus nummularius: *Pers.* p. 535. (W.)
648. P. betulinus: *Fries.* i. p. 358. Boletus betulinus: *Pers.* p. 535. (W.)
649. P. velutinus: *Fries.* i. p. 368. Boletus velutinus et lutescens: *Pers.* p. 539. *Muhl. Cat.* (W.)
650. P. abietinus: *Fries.* i. p. 370. Boletus abietinus: *Pers.* p. 541. (W.)
651. P. cinnabarinus: *Fries.* i. p. 371. Boletus cinnabarinus. *Pers.* 540. (W.)
652. Hydnum faginæum? *Fries.* i. p. 473. (W.)
653. Thelephora purpurea: *Pers.* p. 571. (W.)
654. Th. amorpha: *Greville.* Peziza amorpha: *Pers.* p. 657. (W.)
655. Tremella mesenterica: *Pers.* p. 622. *Muhl. Cat.* (W. B.)
656. Peziza sarcoides; *Pers.* p. 633. *Muhl. Cat.* p. 108. (W.)
657. P. populnea: *Pers.* p. 672. (W.)
658. Erinæum betulæ: *Greville, Ed. Philos. Journ.* v. 6. p. 77. t. 3. f. 1. (W.)

ALGÆ.

659 Oscillatoria muralis: *Agardh. Syn. Alg. Scand.* p. 108. (B.)
660. Conferva glomerata: *Agardh.* p. 89. *Muhl. Cat.* (W.)
661. Ulva crispa: *Agardh.* p. 43. *Lightfoot. Fl. Scot.* p. 972. (B.)
662. U. montana: *Eng. Bot.* t. 2193. (exclud. *Syn.* Palmellæ alpicolæ *Lyngbye*) Palmella rupestris: *Lyngbye, Hydrophytolog. Dan.* (excludend. Tremell. sab. et Ulv. rupestris, *Eng. Bot.*)
663. Fucus ceranoides: *Wahl. Fl. Lapp.* p. 490. (A.)

Exclusive of a Conferva, and the fragment of a Floridea *(Lam.)*, this was the only alga we observed in the Arctic Sea.

ADDENDA, BY ROBERT BROWN, F.R.S.

EUTOCA. *Brown.*

SYST. LINN. Pentandria Monogynia, post Hydrophyllum.

CHAR. GEN. *Calyx* **5-partitus, persistens.** *Corolla* **subcampanulata: membranulæ tubi decem, per paria filamentis alternantes.** *Stamina* **exserta.** *Stylus* **bifidus.** *Capsula* **polysperma, unilocularis, bivalvis, valvis indivisis medio placentiferis.**

ORD. NAT. Hydrophylleæ, *Brown in* **(Prodr. Fl. Nov. Holl. 492.)** *Bot. Regist.* **242. post Phaceliam.**

CHAR. GEN. *Calyx* **quinquepartitus, sinubus edentulis.** *Capsula* **polysperma.**

Herbæ *annuæ, pubescentes, eglandulosæ.* **Folia** *alterna, sæpius pinnatifida, nunc indivisa!* **Racemi** *terminales et quandoque è summis alis, secundi, ebracteati, novelli spiraliter revoluti.*

Obs. Ad hoc genus, a coordinatis (Hydrophyllo, Nemophila, Ellisia, Phacelia) diversum ovulis placentæ singulæ numerosis (unde nomen), pertinent E. ***Menziesii,*** **(erecta, foliis linearibus integerrimis nonnullis quandoque incisis, ovulis placentæ singulæ viginti pluribus,) quæ forsan Hydrophyllum lineare,** ***Pursh. Am.*** **i. p. 134; et** ***E. parviflora*** **(diffusa, foliis pinnatifidis trifidisve; superioribus quandoque indivisis lanceolatis, ovulis placentæ singulæ 6—8,) quæ Phacelia parviflora,** ***Pursh. Am.*** **i. p. 140. Polemonium dubium,** ***Linn.***

EUTOCA FRANKLINII. *Tab.* 27.

Eutoca **erecta, foliis pinnatifidis bipinnatifidisve, ovulis placentæ singulæ viginti pluribus.**

Hab. **Abundantly amongst trees that have been destroyed by fire, on the banks of the river Missinippi.**

Herba **annua, erecta pubescens 6-10-uncialis.** ***Radix*** **descendens subramosa.** ***Caulis*** **simplicissimus teres cavus, crassitiè pennæ columbinæ, fuscus, pilis acutis tenuibus patulis pubescens.** ***Folia*** **radicalia conferta, caulina alterna; omnia petiolata exstipulata pinnatifida, (in plantis procerioribus bi-pinnatifida,) circumscriptione lanceolata, laciniis lanceolatis integerrimis, inferioribus quandoque dentatis incisisve, plana utrinque viridia pilisque caulinis similibus pubescentia.** ***Petioli*** **foliis breviores super canaliculati basi parum dilatata semiamplexanti.** ***Spicæ*** **racemosæ breves secundæ, ebracteatæ, novellæ arcuato-recurvæ, approximatæ, terminales et e summis alis.**

Calyx **monophyllus æqualis quinquepartitus sinubus edentulis, foliaceus, persistens:** ***laciniæ*** **lineares acutiusculæ planæ, trinerviæ nervis lateralibus margini approximatis medio venoso, hirsutæ pilis acutis strictis marginalibus crebrioribus longioribusque.**

Corolla **monopetala, hypogyna, regularis, subcampanulata, calyce sesquilongior, glabra limbo extus pube rara consperso, cærulea immaculata, siccatione sæpius albescens, decidua.** ***Tubas*** **intus nervis 15, ternatim cum staminibus alternantibus, lateralibus ternationis singulæ infra medium auctis membranula lineari imberbi apice subtruncato medium fere tubi attingenti, basi ad ortum filamenti respondentis producta et cum eodem fere confluenti, versus nervum medium conniventi.** ***Faux*** **nuda.** ***Limbus*** **tubo brevior, 5 partitus, æqualis, patens, lobis sub-rotundis integerrimis planis, venosis venis anastomosantibus, æstivatione imbricatis gemma obtusa.**

Stamina 5, epipetala, æqualia, limbum corollæ paulò superantia. *Filamenta* prope basin tubi inserta cum limbi laciniis alternantia, filiformia, basi parum dilatata, pilosiuscula pilis longiusculis sparsis in ipsa dilatata basi crebrioribus, æstivatione induplicata. *Antheræ* ovali-oblongæ imberbes, incumbentes, basi semibifidæ lobis approximatis, loculis parallelo-contiguis medio longitudinaliter dehiscentibus. *Pollen* sphæricum simplex læve, in cumulo albicans.

Pistillum altitudine staminum. *Ovarium* liberum, sessile ovatum pilosum, basi auctum disco annulari adnato, uniloculare, placentis duabus parietalibus semiseptiformibus cavitatem fere bipartientibus, polyspermis lateribus ovuliferis ventre plano nudiusculo: *ovulis* plurimis (30 pluribus) in singula placenta confertim nec utrinque seriatim affixis. *Stylus* 1, filiformis pilosiusculus, semibifidus, laciniis filiformibus æqualibus modice patentibus glabris. *Stigmata* obtusa papulosa ipsis apicibus laciniarum styli paulo crassiora.

Capsula calyce persistenti parum aucto cincta eoque paulò brevior, ovata modice ventricosa, pilosa, unilocularis, bivalvis, valvis indivisis medio placentiferis, placentis adnatis longitudine fere loculi, lateribus seminiferis ventre nudiusculo. *Semina* numerosa in singula placenta viginti plura maturescentia, parva, circumscriptione ovalia, trigona angulis anguste alatis, areolata fusca, nucleo ovali.

TABULÆ 27. EXPLICATIO.

Eutoca Franklinii, magnitudine naturali cum foliis duobus separatis, quorum alterum bipinnatifidum ad procerius alterum ad nanum exemplar pertinet.

Sequentes omnes ad lentem auctæ.

a. ejusdem. Calyx apertus cum Pistillo.

b. ——— Corolla aperta exhibens paria quinque membranularum tubi et Stamina cum iisdem alternantia.

c. ——— Anthera cum portione filamenti.

d. ——— Ovarii sectio transversalis exhibens placentas duas parietales polyspermas.

e. ——— Capsula haud penitus matura.

f. ——— Capsulæ sectio transversalis.

g. ——— Semen.

1. Eutocæ Menziesii, Capsula matura aperta. 2. Ejusdem Capsulæ valvula altera exhibens placentam seminibus denudatam. 3. Ejusdem Semen. 4. Idem testa remota. 5. Sectio longitudinalis Albuminis Embryonem ostendens.

HEUCHERA, *Linn.*

Pentandria Digynia. *Flores pentapetali, superi, capsulares* cum Vahlia.

Char. Gen. *Caps.* unilocularis, placentis 2, parietalibus adnatis polyspermis. *Calyx* 5-fidus (nunc inæqualis), æstivatione imbricata.

Ord. Nat. Saxifrageæ inter Telliman et Vahliam.

Char. Gen. *Calyx* 5-fidus, æstivatione imbricata. *Petala* indivisa. *Stamina* 5. *Ovarium* uniloculare, placentis duabus adnatis polyspermis. *Styli* 2. *Capsula* semiinfera, flore emarcido coronata, birostris, inter rostra dehiscens.

Herbæ *perennes, sæpius acaules.* Folia radicalia *conferta, elongato-petiolata, cordata, sublobata lobis serrato-incisis;* stipulis *lateralibus infra adnatis apicibus distinctis:* caulina, *dum adsunt, alterna, minora, brevius petiolata.* Scapi *paniculati, pedunculis trifidis basi unibracteatis, divisuris bibracteatis.*

Obs. I. In ordine Saxifragearum locus Heucheræ est inter Mitellam grandiflorum *Pursh.* (Tellimam) convenientem capsulæ unilocularis birostris dimidio supero flore persistente tecto, diversam staminibus

decem, petalis laciniatis ; et Vahliam *Thunb.* (cujus certè species genuina est Oldenlandia pentandra *Retz.* quæ Oldenlandia *Smith in Rees. Cyclop.*) similem floribus pentandris, petalis indivisis, et capsulæ unilocularis dehiscentia, distinguendam placentis ab apice cavitatis pendulis solutis, æstivatione valvata calycis et habitu diversissimo.

Obs. II. A Saxifrageis transitus haud difficilis ad *Ribes* structura floris et ovarii admodum simile *Heucheræ*, diversum stylo semibifido, fructu baccato, albumine densiore, funiculis umbilicalibus longis ad chalazam usque liberis ! et habitu. Attamen vel in eadem prorsus familia cum Ribe includenda, vel in proximo ordine (Escalloneæ) disponenda Escallonia *Mutis.* (Stereoxylon *Ruiz et Pavon.*) et nonnulla genera inedita Novæ Hollandiæ, nec non Anopterus *Labill.* (*et Prodr. Fl. Nov. Holl.* 457.) cujus petala distincta, calyci inserta et ovarii capsulæque basis adhærens. Sed Anopteri cum Saxifrageis affinitas mediante Heuchera in fructificatione saltem obvia, obstante quidem habitu omnino cum Escalloneis et nec Cunoniaceis nec Saxifrageis conveniente.

HEUCHERA RICHARDSONII. *Tab.* 29.

Heuchera calycis limbo inæquali obliquo.

Hab. On the rocky banks of rivers from lat. 54° to 64° north.

Desc. *Herba* acaulis, perennis. *Folia* radicalia conferta, elongato-petiolata, cordata, diametro sesquipollicari, semiseptemloba, lobo medio majore, omnibus inæqualiter serrato-incisis, super scabra subter lævia, secundum nervos venasque primarias pubescentia pilis brevissimis acutis, eglandulosa. *Petiolus* folio longior, triuncialis, pilosiusculus, scaber, antice canaliculatus. *Stipulæ* laterales infra adnatæ, apicibus lingulatis scariosis subciliatis. *Scapus* simplex, erectus, pedalis—sesquipedalis, gracilis, teres, striatus, pilosiusculus, dimidio inferiore pilis acutis divaricatis glandulisque intermixtis paucissimis, superiore pube brevissima glanduloso-capitata copiosa pilisque acutis rarioribus. *Panicula* laxe thyrsoidea, angusta, ramis alternis bractea lineari apice bi-trifido subtensis, trifidis pedicellis lateralibus 1-2-floris medio unifloro præcociore, divisuris singulis bibracteatis, bracteolis lineari subulatis glanduloso-pubescentibus.

Calyx monophyllus, campanulatus, irregularis, persistens, extus glandulis subsessilibus parvis copiosis tectus: *limbus* obliquus 5-fidus, laciniis obtusis obovatis magnitudine subæqualibus sed ob faucis obliquitatem altitudine inæqualibus, duabus altioribus paribus impari demissiori. omnibus quinquenerviis nervis venosis, æstivatione imbricatis, duabus altioribus reliquas equitantibus.

Petala 5, ipsis sinubus calycis inserta, unguiculata, indivisa, brevè ciliata, vix calycis lacinias superantia, persistentia, altiora lamina cuneato-obovata, demissiora sublanceolata, omnia trinervia nervis extus venosis, unguibus angustis linearibus.

Stamina 5, summo tubo calycis inserta, ejusdem laciniis opposita, petala vix superantia, persistentia. *Filamenta* subulata, glabra, laciniis calycis altitudine proportionata. *Antheræ* incumbentes, brevè ovales, obtusæ, loculis parallelo-contiguis, longitudinaliter dehiscentibus. *Pollen* lateritium.

Pistillum: Ovarium semiinferum, uniloculare, placentis duabus parietalibus longitudinaliter adnatis prominulis, cum stylis alternantibus, polyspermis: *ovulis* indefinite numerosis confertis superficiem ventralem lateraque placentæ operientibus. *Styli* duo, subulati, glabri, altitudine staminum. *Stigmata* obtusa imberbia, apicibus stylorum vix crassiora.

Capsula semiinfera, dimidio supero breviore calyce aucto persistente cum petalis vix emarcidis et filamentis sæpe antheris orbatis tecto, stylis rostrato, apice bilobo lobis intus dehiscentibus, unilocularis, placentis proportionatim auctis.

Semina numerosa, sessilia, ovalia, punctis elevatis acutis longitudinaliter seriatis aspera, altera extremitate obtusiore. *Testa* crasso-membranacea, fusca, facile separabilis. *Membrana interna* albumini arcte adhærens absque chalaza rapheve manifesta. *Albumen* semini conforme, album, carnosum, molle, oleosum. *Embryo* minutus, subovatus albus ad albuminis extremitatem obtusiorem situs. *Cotyledones* brevissimæ. *Radicula* processu capillari terminata, centrifuga.

TABULÆ 29. EXPLICATIO.

HEUCHERA RICHARDSONII, magnitudine naturali. i. basis dilatata petioli cum stipulis infra adnatis.

Figuræ sequentes ad lentem plus minus auctæ.

a. Flos plurimum auctus. *b.* Idem hinc longitudinaliter apertus. *c.* Ovarium longitudinaliter sectum placentas parietales adnatas accurate, sed perperam stylos infra connatos, exhibens. *d.* idem transversè sectum. *e.* Capsula matura flore stylisque coronata, paulo tantum aucta. *f.* Ejusdem sectio transversalis. *g.* Semen plurimum auctum. *h.* Idem testa orbatum.

CRYPTOGRAMMA. *Brown.*

ORD. NAT. Filices. *Gyratæ (Polypodiaceæ)* inter Onocleam et Lomariam.

CHAR. GEN. *Sori* lineares (v. subrotundi) venulis costæ (pinnulæ) obliquis insidentes. *Capsulæ* pedicellatæ, receptaculo communi elevato nullo. *Involucrum commune* (pinnulæ) marginale, continuum, disco venoso, margine scarioso libero sæpius induplicato; *partiale* nullum.

Filiculæ *glabellæ.* Frondibus *cæspitosis bi-tripinnatifidis: centralibus mutato-contractis fertilibus, exterioribus sterilibus.* Involucris *dorsum totum pinnulæ tegentibus.* Capsulis *brevè pedicellatis, annulo incompleto.* Sporulis *obtuse trigonis, lævibus.*

Obs. Typus generis est Cryptogramma acrostichoides, sed character constructus pro receptione Pteridis crispæ *auctor.* quæ dubia equidem species, ob soros abbreviatos potius subrotundos quam lineares, venulas terminantes sinum ferè involucri occupantes et cito confluentes, tunc æmulantes sorum linearem continuum costæ parallelum Pteridis, cum cujus speciebus pinnulis angustatis involucro omnino tectis, habitu benè satis convenit. C. acrostichoides habitu et sororum dispositione et forma Grammitidibus nonnullis præsertim G. leptophyllæ analoga, diversa frondibus fertilibus distinctis et præsentia involucri dorsum totum pinnulæ tegentis: His notis autem Cryptogramma convenit cum Pteridi thalictroidi *Swartz* (à nobis tredecem abhinc annis in *Prodr. Fl. Nov. Holl.* i. p. 154, uti genus distinctissimum indicata.) In hoc genere (Teleozoma *nob.*), Capsulæ sessiles, annulo completo latissimo, distinctæ in serie simplici insident venis costæ parallelis, utrinque vel solitariis marginalibus, vel binis altera superficiaria. Teleozoma insuper insigne est sporis in ordine naturali forsan, in tribu quantum scio maximis obtuse trigonis pulchre striatis, puncto unico opaciore.

CRYPTOGRAMMA ACROSTICHOIDES.

Cryptogramma, frondibus bipinnatifidis, sterilium pinnulis ovalibus crenatis; fertilium demum explanatis, soris linearibus discum totum occupantibus.

Hab. In shady rocky woods, between lat. 56° and 60° north. (First found by Mr. Menzies at Nootka Sound.)

DESC. *Filix* 4-8-uncialis, glabra, lætè virens, frondibus cæspitosis, stipitatis, crasso membranaceis opacis venis vix adversus lucem conspicuis.

Frondes exteriores cæspitis *steriles,* circumscriptione lanceolatæ bipinnatifidæ apice pinnatæ pinnis distinctis alternis, brevissimè petiolatis; pinnulis confluentibus, ovalibus obtusis, crenatis, inferioribus passim dentatis, omnium venis e costa vix prominula acutangulis distinctis simplicibus bifidisve intra marginem crenaturæ desinentibus. *Stipites* pallidi, subtus semiteretes anticè bisulci, infra medium conspersi squamulis lineari-lanceolatis acuminatis disco fusco-atro limbo pallido, supra glabri. *Rachis* epaleata, angusta, compressa, colore et

et fere substantia frondis. *Frondes* centrales *fertiles* stipite sterilium longiore alioqui simili insidentes bipinnatæ: pinnæ petiolatæ; *pinnulæ* omnes fructiferæ distinctæ inferiores brevissimè petiolatæ; ante explicationem involucri lineares, limbo utrinque recurvo, efformante *involucrum* fornicatum discum totum operiens pallide viride venosum margine scarioso avenio sæpius induplicato: demum explanatæ angusto-oblongæ involuero quasi nullo: costa subtus particulis parvis flavis conspersa, venis costæ obliquis, altè bifidis fere bipartitis, distinctis.

Sori ramulos omnes venarum à basi fere ad apicem occupantes, lineares, distincti sed ita approximati ut discus totus pinnulæ explanatæ capsulis maturis tectus est et in hoc stadio filix species Grammitidis vel Acrostichi quasi evadit.

Capsulæ brevè pedicellatæ, turgide lenticulares annulo incompleto, altero lateri infra annuli terminationem transversim dehiscentes, *receptaculo* communi elevato nullo sed venæ parum incrassatæ insidentes.

Sporulæ triangulares, læves, absque striis manifestis vel puncto opaciori, in cumulo dilutè flavæ separatim hyalinæ.

THE END.

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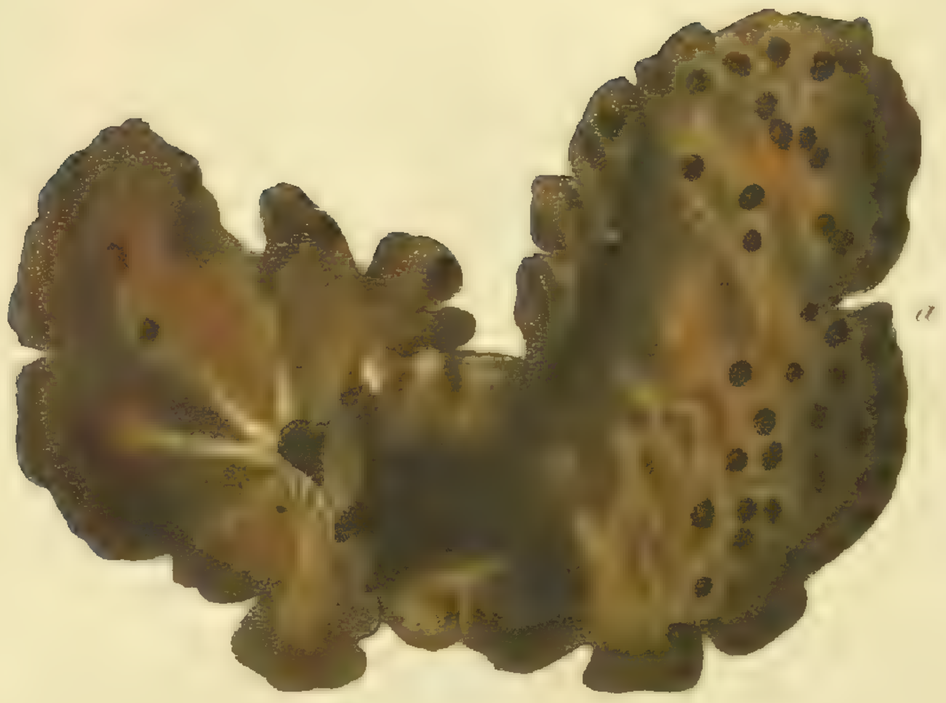
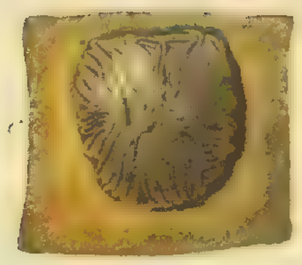
I





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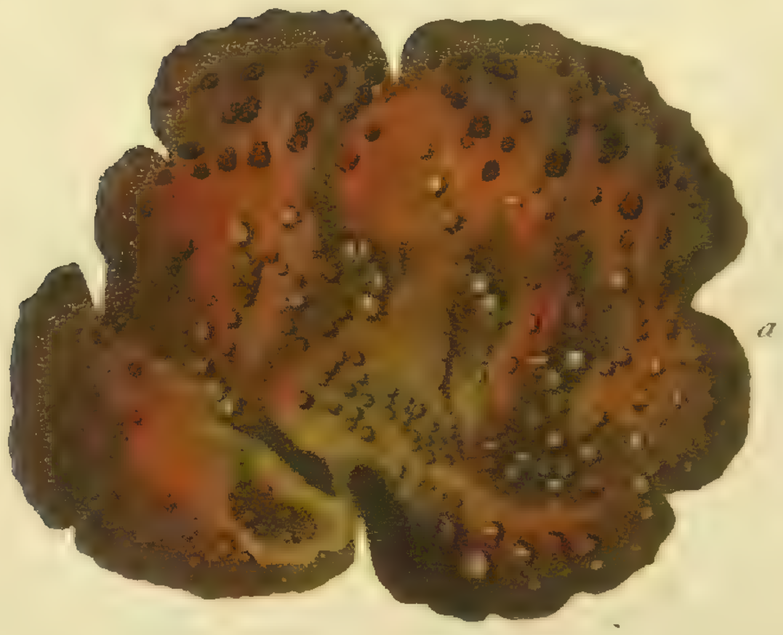

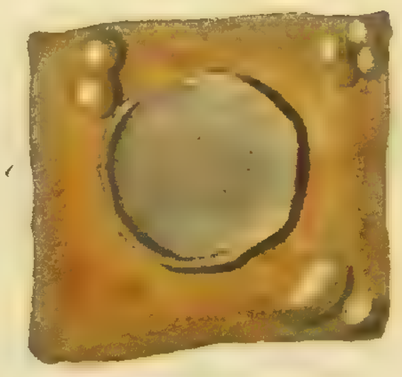

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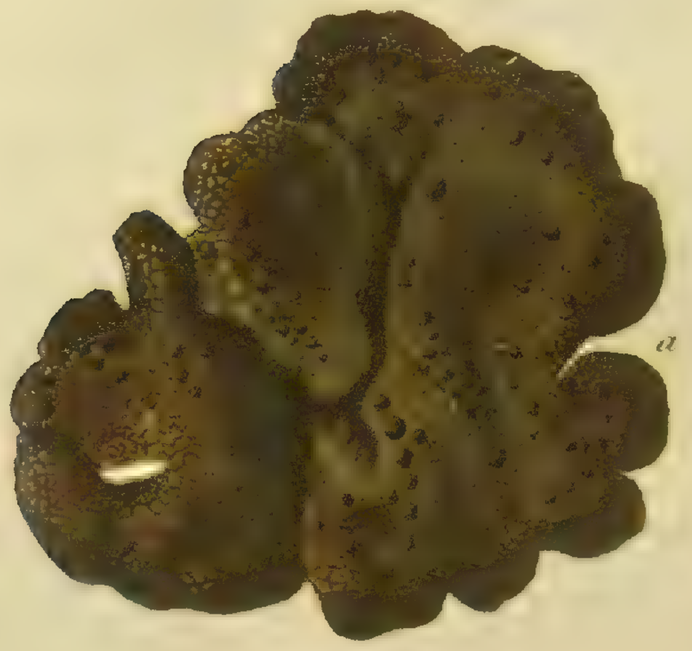

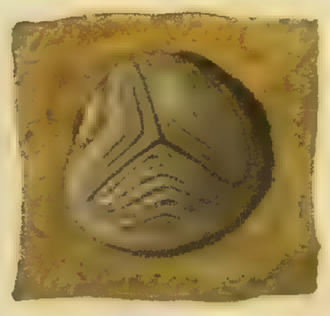

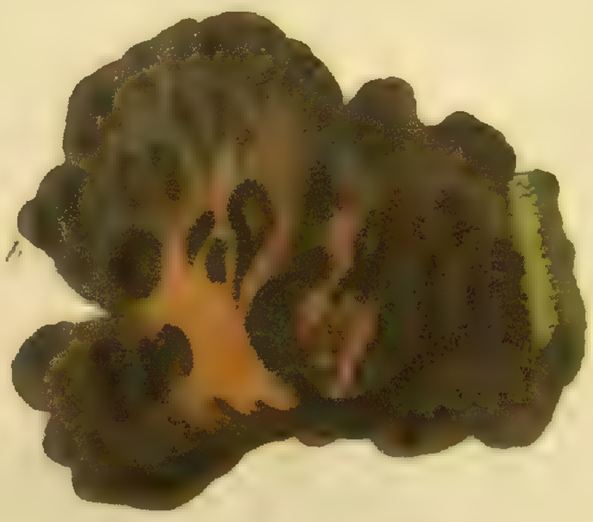

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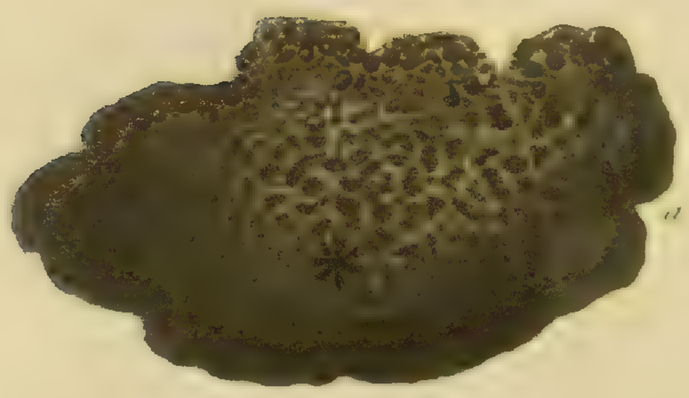

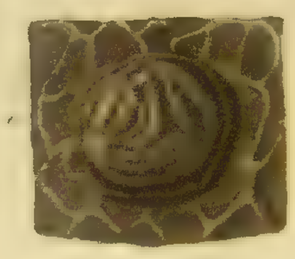

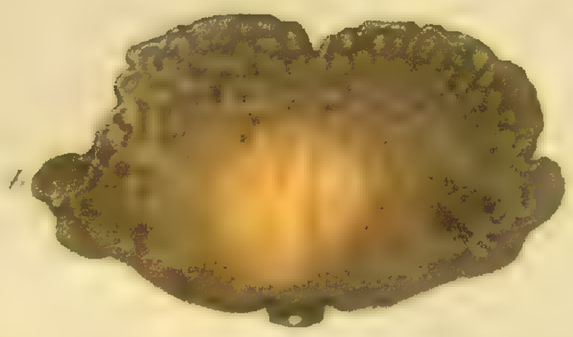

J. Curtis del.(ad sicc) et sculp

Published March 1823, by John Murray, London

Route of the Expedition from York Factory to Cumberland House.

and the SUMMER & WINTER TRACKS from thence to ISLE A LA CROSSE, in 1819 & 1820.

References

† Denotes the place where an Observation for Latitude was taken.
⊙ D° for Longitude. ∀ for Variation. ⊤ for Dip.
—— Direction of the Stream.
The figures at the Portages express the distance in yards of such Portage.

Published as the Act directs March 1st 1823 by John Murray Albemarle Street London.

Route
of the Expedition from
Isle à la Crosse to Fort Providence,
in 1819 & 20.
References
† Denotes the place where an Observation for Latitude was taken.
⊙ Dº Longitude. Y for Variation. ⊤ for Dip.
Direction of the Stream.
The figures at the Portages express the distance in yards of such Portage.
COPPER INDIANS
YELLOW KNIFE R.
Upper Double Fall 130
Lower Double Fall 280
Blue Berry Portº 285
Bow String Portº 2300
Lake Prosperous
Slate Portº 345
Fort Providence N.W.
Rocky
Mackenzies Cape
Reindeer Islands
GREAT SLAVE LAKE
Stony I.
SLAVE RIV.
Fort Resolution H.B.
Slave Fort N.W.
Dease R.
Thickly wooded Pines, Poplars, Larches, Cypress and
low consisting of alluvial Flats
Frequented by Buffaloes, Moose and Red Deer.
Salt Springs and Plains
Portº 745
Landed July 18th
PEACE RIVER
Fort Chipewyan N.W.
Mustard I.
Fr Wedderburne H.B.
LAKE ATHABASCA OR LAKE OF THE HILLS
Lake Mammawee
Plentifully supplied with grease
HB. de Pierre au Calumet
Peat, Coal & Sulphur springs
High and steep banks
Salt Springs
Floetz Limestone
Washa Cummow R.
LA BICHE R.
Hills from 600 to 1000 feet high Soil Sand & Clay
Abounding in Black and Brown Bears and Moose
Methye Lake
N.W. House
H.B. House
Methye River
R. Pembina
Buffalo Lake
Grizzle Bear Hill
N.W. House
Beaver R.
CHIPEWYANS
CREES
La la Crosse Fort Hope
N.W. House
Beaver Road
Train Lake
Woody Island
Long Lake
Long Portº
Published as the Act directs March 1823, by John Murray, Albemarle Street London.
Walker Sculpt.

An Outline
to shew the
CONNECTED DISCOVERIES
of
Captains Ross, Parry & Franklin,
IN THE YEARS
1818, 19, 20 AND 21.

Published as the Act directs March 2823 by John Murray Albemarle Street London.

J.Walker Sculpt

A CHART of the DISCOVERIES & ROUTE OF THE NORTHERN LAND EXPEDITION, under the command of CAPTAIN FRANKLIN, R.N. in the Years 1820 & 21.

Laid down under his inspection

BY the

OFFICERS ASSISTING IN THE EXPEDITION.

References

† Denotes the place where an Observation for Latitude was taken

⊙ D° for Longitude Y for Variation T for Dip

→ Direction of the Stream

The figures at the Portages express in yards the length of such Portage

——— Route going out ——— Returning

——— Excursions from Fort Enterprise during the winter.

Published as the Act directs March 8th 1823 by John Murray Albemarle Street London.

J. Walker Sculp.